DRAGON USER

The independent Dragon magazine

July 1986

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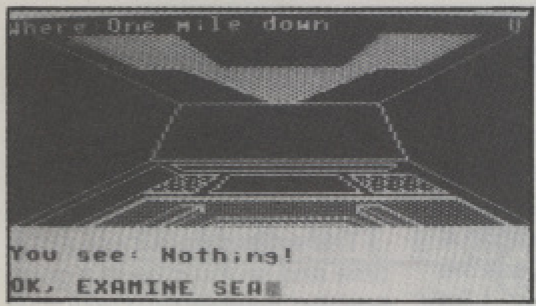
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Editorial

WELCOME to the new Dragon User, By Subscription Only. DU's regulars are the heart of the Dragon community in Britain, with many nerves and arteries reaching overseas to Europe and beyond.

Gamesplayers, serious programmers, and users experimenting with system design and communications have found the Dragon (which is the only popular 6809 machine in the UK) a powerful and versatile tool and a good companion. Good enough to stick with despite the competition.

Now the Dragon world needs to stick together, keep the news circulating and ideas developing. Write to us about your User Group; show your copy of Dragon User to other Dragon owners, who may have missed their chance to subscribe through lack of foresight (or funds), so that they know that Dragon's own forum is still going strong.

Remember — if you want to subscribe, nothing could be easier. Send off £14 (in the UK) or £20 (overseas) to Dragon User, 12-13 Little Newport Street, London WC2 for 12 issues.

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Subscriptions
UK £14 for 12 issues
Overseas (surface) £20 for 12 issues
ISSN 0265-0177. Telex: 296275
Dragon User, 12/13 Little Newport Street, London WC2H 7PP
US address: c/o Business Press International, 205 East 42nd St, New York, NY 10017
Published by Sunshine Books, Scot Press Ltd.
Typesetting by Chesham Press, Chesham, Bucks.
Registered at the Post Office as a newspaper

How to submit articles

The quality of the material we can publish in *Dragon User* each month will, to a very great extent depend on the quality of the discoveries that you can make with your Dragon. The Dragon computer was launched on to the market with a powerful version of Basic, but with very poor documentation.

Articles which are submitted to *Dragon User* for publication should not be more than 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program returned you must include a stamped, addressed envelope.

Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.

Puzzle Query

I AM an avid fan of your competition page. Most of us realise we have only a small chance of winning, but because we have taken time and trouble to complete the programs we would like to know the correct result and method to be used. Not just those who send in entries — after all, they have some idea. Others may be baffled but interested — why not give them the pleasure of learning from the correct method?

Denis O'Mulloy
23 Swaynes Lane
Comberton
Cambs CB3 7EF

If we get enough demand for this, we will ... but what should we drop to make the space?

Please don't feel neglected if you send an SAE but don't get a reply. *DU* doesn't support enough editors to write personally to all our readers — so we concentrate on urgent queries — where we are able to find an answer, that is. A good form of support is for readers to send us any information about problem-solving, or software news.

Screen Change

IN ANSWER to Alan Green's letter (*Dragon User* Dec. 85) the program listed at the bottom of the page will convert the text screen to green on black. The CLS command is also updated but the CLEAR key and the RESET button will result in a green screen.

Has anybody had any luck with Splitz? I've carefully entered the program using several methods but each time I just get an irritating flicker.

```
 10 CLEAR200, 32539
 20 FORI=32540 TO 32635:
    READA$
 30 POKEI, VAL ("&H" +
    A$): NEXT
 40 FORI=0 TO 127: PRINT
    @ 0.CHR$(I);
 50 POKEI + 32637, PEEK
    (1024): NEXT
 60 POKE 359, 126: POKE
    360, 127
 70 POKE 361, 28: POKE
    416, 126
 80 POKE 417, 127: POKE
    418, 109
 90 CLS
100 DATA 32, 62, 34, 36, 9E,
    88, 81, 8, 26, D, 8C, 4, 0,
    27, 35, 86, 20
110 DATA A7, 84, A7, 82, 26,
    15, 81, D, 26, 4, 8D, 29,
    20, D, 4D, 2B
120 DATA 8, 10, 8E, 7F, 7D,
    A6, A6, 88, 40, A7, 80,
    9F, 88, 8C, 5
130 DATA FF, 23, 11, 8E, 4,
    0, EC, 88, 20, ED, 81,
    8C, 5, EO, 25
140 DATA F6, 9F, 88, 8D, 2,
    35, B6, 86, 20, A7, 80,
    1F, 10, C4
150 DATA 1F, 26, F6, 39, 2F,
    1, 39, 35, 10, 8C, BA, 62,
    26
160 DATA F8, C6, 20, 7E,
    BA, 79
```

Paul Burgin
18 Moorcroft Road
Sheffield
S10 4GS

Tandy club

FIRSTLY, THANKS for an excellent mag. It is nice to know someone still cares. I own a Tandy CoCo 64K. I have had it for 2½ years, and have been buying your mag all that time.

Now the complaint. How come the CoCo rarely gets a mention? At least half (if not more) of your readers are Tandy owners. So please don't forget us.

Secondly — come on you programmers, don't forget us either. How about writing your programs for the CoCo as well as the Dragon. I know Blaby and Microdeal have, but that is about all.

Thirdly, I would like to start a CoCo/Dragon Users' Club in the Basildon area, to swop programs, ideas, etc. Anyone interested please contact me at the address as shown.

Once again *Dragon User* keep up the good work.

Mr S. R. Kilcoin
187 Spurriers
Laindon
Essex SS15 5NG

Monitor Bug

THANK YOU for publishing my MONITOR program. Unfortunately there is a bug in the program so that the Kopy routine will only work on the graphics pages. To fix the routine, use the <A>lter routine to poke a &H12 into memory locations &HOE74 to &HOE7E. Sorry for any inconvenience this may have caused people.

Peter Whittaker
73 Norwich Street
Cambridge
CB2 1ND

Nice one Roy!

I AM WRITING to compliment Roy Coates on his Jet Set Willy. All the Spectrum owners (one of them anyway) is as sick as a dog because of the seven screens (at the last count) more than the Spectrum's. I keep rubbing it into the cuts in his fingers (from the keyboard).

All in all the game is great and his new game, *Bean Stalker,* looks just as good and this just goes to show the Dragon is far from dead and if you ask me it's more alive than ever. Like what N. T. Butlers said in his letter to the software companies, "You support us, and we will support you."

P.S. I think the *Dragon User* does a lot for the Dragon. Keep up the good work.

J. Elvidge
22 Carlton Avenue
Cheadle Hulme
Cheadle
Cheshire
SK8 5EH

Hacking Mad

ONE PROGRAM I have been trying to hack for the past few months I am glad to say I have finished. The following few pokes, if typed before executing Madness and the Minotaur, give the score command an extra facility. Instead of printing your strength it will reset your strength to its maximum. This has advantages if you get very weak from, say, being molested by creatures, or if you need to make a vital jump.

```
POKE 9613,134
POKE 9614,255
POKE 9615,151
POKE 9616,5

POKE 8728, (0 to 240 in steps
     of 5 — maximum number of points required)
```

or

machine code
LDA 255
STA ‹$05

Simon Hargrave
Crawley Hill Farm
Uley
Dursley
Glos
GL11 5BH

Holy Days

I HAVE BEEN doing a fair amount of research into the Yorkshire Parish Records. All of them give 1750, March 24th/25th, as the change date. (See T. Bottomley's letter, May 1986.)

The writers were there at the time and so must be in a good position to know. (*I wouldn't put it any more strongly than that. — Ed.*)

Apropos of nothing, can anybody tell me when Xmas day was first celebrated as a holiday, as several of my ancestors have been baptised, married and even buried on 25th December.

Denis Greswolde
12 Fairfax Crescent
Southowram
Halifax HX3 9SQ

Apology

The 'Blockbuster' ad. should not have appeared in the May issue. Our sincere apologies to anyone who was inconvenienced by this mix-up, not least to Microdeal themselves.

Dragon User People's Chart

SHOCK success at the Dragon User People's Chart, as Microdeal's Shocktrooper again establishes itself at number one, narrowly beating Juxtaposition.

Much ingenuity appeared in this month's anagrams, although no one has actually scored with that elusive x-factor yet. Honourable mentions go to Keith Turner for his show slogan 'Race to Osset, spend coppers' and to D. I. Green for his sentiment 'What do dragons like to eat? Lots of chips!' Dishonourable mention goes to Stephen Smith, whom delicacy and our legal department forbids us from quoting, but thanks for the chuckle, Stephen. This month's prize goes to Jonathan Fisher of Huddersfield for stating the obvious 'Top three games lost in here', and getting it right, too!

Each month we will be asking you to vote for your top five favourite programs on your Dragon at the moment — games, applications or utilities. Either list them on the form opposite or, if you don't want to damage your Dragon User, just copy them out. To add that frisson of excitement (as if you weren't excited enough already) we will award £25 worth of Microdeal software to the voter who comes up with the slogan which tickles us most. Make up the slogan from letters from your own top three titles (you don't have to use all the letters). You can vote, of course, without sending a slogan — but you won't be in line for the prize. So write, right?

Results May 1986

1 Shocktrooper .... (Microdeal)
2 Juxtaposition .... (Wintersoft)
3 Shaolin Master...................(Quickbeam)
4 Speed Racer .... (Microdeal)
5 Eddie Steady Go .... (Incentive)

Chart Six

Voting for Chart No. 6 closes at 1pm on Friday, 18th July, 1986. Entries received after that time will not be eligible for inclusion in that month's voting. The editor's decision is final. Only one entry per individual per month will be allowed.

My top 5: Voting Month 6	Name ....
1.	Address ....
2.	....
3.	....
4.	....
5.	....

My phrase is: ....

News desk

If you have any new products for the Dragon — software or hardware — ring the News Desk on 01-437 4343

Your Dragon — The Future

NOW THAT *Dragon User* is appearing in its exclusive newsletter form, we asked some of the Dragon's staunchest supporters how they saw their future with the beast. Will the 50,000 Dragon-keepers in *Dragon User's* regular and occasional audience, provide enough enthusiasts to prevent this respected but beleaguered machine from falling below critical population levels as a commercial proposition?

Compusense's Ted Opyrchal hit the nail on the head. "We're still making money out of the Dragon. We're keen on seeing it survive. It's the only popular 6809 machine in the UK, and its strengthened our position in schools and colleges, so we shall continue to support it for as long as we can.

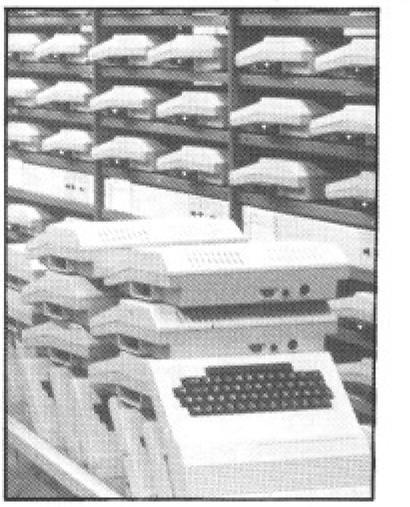
"But we're for serious users at the upper end of the market now. I think games players will be less well served. We've sold hundreds of Dragon Plus cards at £100 a card, but I can't see where else we can go after the Dragon Plus. I can't see the Hard Disk Drives becoming truly popular until hard disk prices come down, which is some way in the future.

"There's going to be a spares shortage. We've run out of replacement transformers — there are no more, so tell everyone to make sure all their leads are properly earthed, and the connectors in the right way round. We lose money on repairs, and now we are running out of parts."

Has he heard from Eurohard in Spain?

"They've closed their Madrid premises and withdrawn to their factory. I've had a 1986 price list, but importing prices just are not economic. I can't get through to anyone there. But it's not all that gloomy — the Dragon has been around for two years longer than anyone predicted, and we're going on with it."

John Bailiss of Blaby Software, and Jenny Pope of Microdeal were both emphatic that, despite Ted Opyrchal's predictions, they had plenty of new games coming along, and *Dragon User* subscribers



would be hearing about them pre-release as usual. "I've been telling people that *Dragon User* won't be on the news-stands," said John. "Some of them are a bit perplexed about what's happening." All is explained on this month's front page. Jenny reminds everyone again that Microdeal are organising the 6809 Show at the Royal Horticultural Halls in Victoria, London, on 22nd November. More information from Microdeal on 0726 68020.

Less happy news came from Melbourne House — especially for *Dragon User* prizewinners in the April contest. Melbourne have used up their stocks of *Enter the Dragon*, and won't be reissuing the game. But they hope to retrieve some copies for the remaining winners.

Problem-stricken company Eclipse/Fenmar Ltd are still struggling to sort out their backlog of customers with *Total Eclipse* problems, according to the Birmingham Consumer Service. Some users have received replacement games, but are still having trouble with the program. "The company simply ran into difficulties which it didn't foresee," says the man from the BCC. What a tragic end to a good idea.

Practical Programs

PRACTICAL programs for small businesses are the new speciality of Warrington software publishers Buzz Software. They are offering an information pack on their software, plus a discount of £1.50 on the S.B. packages, until 31st July, 1986. Most of the S.B. range can use one another's data files, and are priced at £5.

For information send a 17p stamp or SAE to: Simon Goodwin, Buzz Software, 15 St Stephen Road, Penketh, Nr Warrington, Cheshire WA5 2AN.

Convention Report

THE FIRST 6809 convention was held on Saturday and Sunday the 5th and 6th of April in the entrance hall of the Umist buildings in Manchester. Most of the regular exhibitors were present, and several guest speakers were invited.

The speeches on Saturday included a very highbrow talk by Stan Oprychal of Compusense on the values of Flex against OS-9, a very well-received talk on programming techniques from Gordon Twist (who, incidentally, runs a cheap and efficient repair and upgrade service (on 050-982 3722), and an absolutely excellent speech by Keith Rose of Modem House.

Sunday arrived under an atmosphere of disappointment from the companies who, on the whole (ie, apart really from Microdeal) were not selling as much as they had hoped. Most of them said that they would attend the next convention, but that they could sell more in one day in London than in two north of Watford, in a nutshell.

The show's atmosphere was in its element when the floor was opened to general discussion and a very obvious spirit of co-operation in a difficult situation (as undeniably is that of the Dragon) could be seen.

Two awards were presented, the Broken Dongle to an embarrassed Roy Coates, and the Program of the Year award, which was given to Microdeal, rather unsurprisingly, for *Shocktrooper.*

And that was it. Disillusionment for the companies, but for the crowd a communal enjoyment.

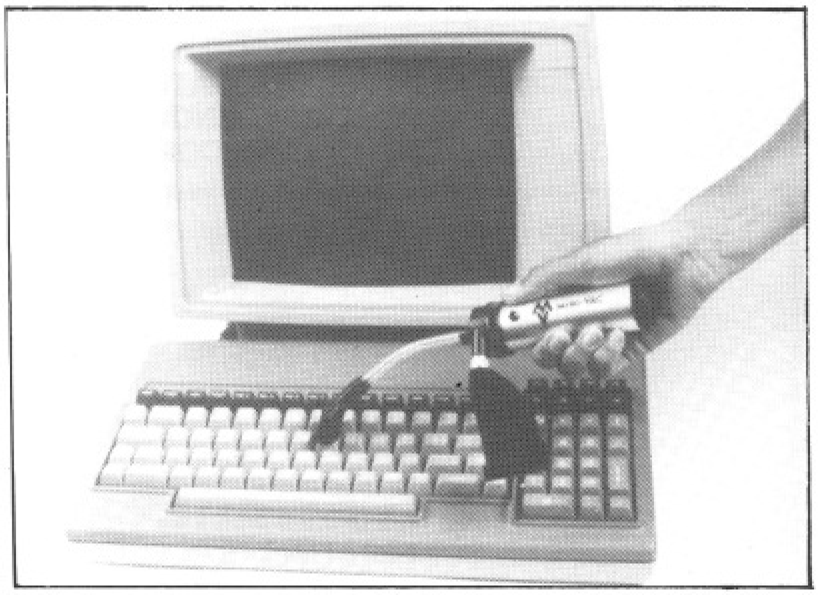
I thought this convention was an improvement on the previous shows and would like to see it in London, soon . . . but if you disagree, you know the address.

J.O.

Suck it and see

'HOUSEKEEPING' is all part of a programmer's routine. Now there is a Mini-vacuum cleaner to help out with housekeeping of the traditional kind, in and around the hardware. The battery-operated Mini-Vac will either suck up dust and fluff into its bag, or blow loose dirt away. There is a choice of straight or curved vacuum pipe, and all-purpose or lens-quality brush. Useful for anyone who does repairs or other inside work.

Mini-Vac costs £11.95, including VAT and postage, from Authenticity, PO Box 34E, Worcester Park, Surrey KT4 7YH, or from specialist and hardware stores.



Communication

Send in you questions, requests, and pleas to Communication, Dragon User, 12-13 Little Newport Street, London WC2

Problem Can anyone give me a routine dumping the Hi-res screen on to a Smith Corona Fastext 80, or the suppliers of memory maps?
Name Mark Treglown **Address** 10 East Bank, Selsey, Chichester, West Sussex PO20 0SP.

Problem Can anybody tell me where I can obtain the memory map or firmware for the Delta DOS system? (Premier did produce a manual.)
Name Andy Jackson **Address** 24 Burnwood Drive, Wollaton, Nottingham NG8 2DJ.

Problems I have just bought a Dragon 32. There isn't much information about it in Sweden. Can anybody tell me please:
Is there any deepgoing memory map, with a useful ROM-routine address, to buy?
Is there a layout of the computer with information about signals on the user port?
If interrupts are vectored through the RAM, so you can work multitasking?
Is it possible to change character colour or use more than one colour at a time in character mode and highest resolution (with assembler programming)?
Name Jorgen Larsson **Address** Humlevagen 12, 46165 Trollhättan, Sweden.

Problem Could you please tell me if there is a book for graphic adventures for the Dragon 32. If there is, how much it costs and where I can purchase it. I am trying to write my own programs and feel they would be more interesting if I could include graphics.
Name David Penman **Address** 63 Gean Road, Alloa, Scotland FK10 2JP.

Problem I have a Cumana disk drive with Premier Delta DOS. Can anybody out there give me the jump addresses for the various commands, eg, Loan, Save, Chain, etc? Also, can anyone help with locating the Dragon error trapping routine, as I want to redirect the system when an error occurs.
Name Trevor Haddrell **Address** 12 Meadow Close, Shaftesbury, Dorset SP7 8EF.

Problem I recently bought a Dragon DOS Delta interface and a Cumana CS100 drive for my Dragon. If possible I would like to have the entrypoints with the conditions to enter the routines and the way they leave them, for the most useful machine code in the Dragon DOS.
Name Dany Pinoy **Address** Benediktijnenstraat 53, 8320 Brugge 4, Belgium.

Problem Could someone please send me some more information other than that in the manual about the Dragon/Tandy speech/sound cartridge by Radio Shack.
Name Tommy Lorimer **Address** 443 Delgatie Court, Pitteuchar, Glenrothes, Fife, Scotland KY7 4RW.

Communication

Stuck for a routine? Need some obscure equipment? Feeling cut off? Fear not — someone, somewhere can help you! Write down your problem on the coupon below (make it as brief and legible as possible) together with your name and address and send it to Communication, Dragon User, 12/13 Little Newport Street, London WC2H 7PP. We'll publish it as soon as we can — meanwhile, maybe there's someone you can help this month!

Problem...
....
....
Name...
Address...
....

Dragonsoft

New software for review should be sent to *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.

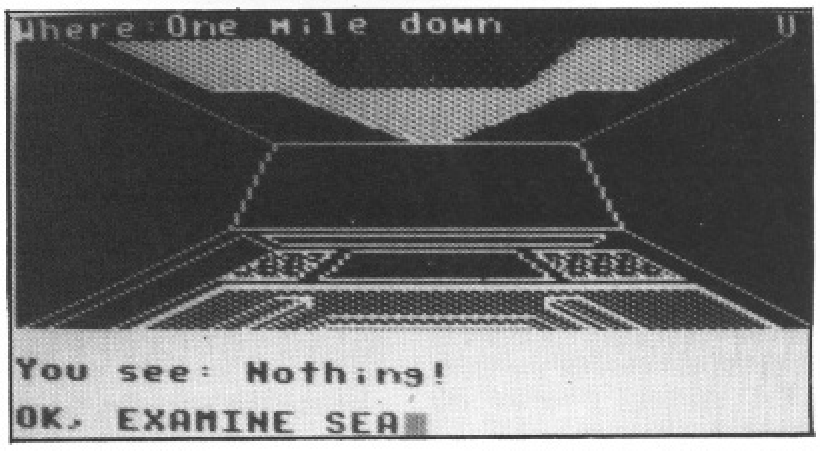
Underwater

Program: Aquanaut 471
Supplier: Microdeal
Price: £5.95

THE first of the three new Microdeal releases under the axe this issue is this adventure which is set underwater. The game starts on the ocean surface; you dive and start hunting around when your craft is rocked by an underwater explosion. You go off to investigate and find yourself in an underwater complex trying to save the place from a watery demise.

Bearing in mind that you're doing them a favour, the security forces are particularly unhelpful, indeed there are two sets of them and if you're not very quick on the joystick you'll get sent back to the entrance again!

I say quick on the joystick because this is a most unusual adventure in many ways. The graphics (the game is split screen — top half for graphics, bottom half for text) are very unusual in their style although they do have a certain clarity after the player is accustomed to them. The game runs like an adventure, with the very useful facility of being able to move with the arrow keys (a la Sysygy) but suddenly on arrival at certain locations the player is required to play a very simple arcade game to progress. No doubt this will annoy some people but I found it refreshing and the games have the advantage of being solvable; once a game has been completed there is very little problem in doing it again and



again first time.

The adventure is not particularly difficult to solve but is very good fun to play. Especially pleasing is the section involving finding a robot called Huey! It's a couple of afternoons relaxed thought to solve this one and I can recommend it as an introduction to adventuring (and Map-making, as it's fairly straightforward).

This is the sort of adventure I could quite easily play while sunbathing! It has that really nice relaxed edge which comes from it being set in an original environment. As you may have guessed, I like it.

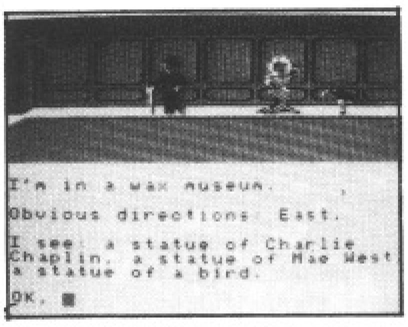
Jason Orbaum

Timely

Program: The Vortex Factor
Supplier: Microdeal
Price: £5.95

THIS is the other new adventure from Microdeal and is by the Trekboer team which stands as an indication of its quality. Where Trekboer was about space travel, this one concerns itself with time travel and is, again, a very good game.

I haven't finished it, would you believe I need a light! Yep, that old chestnut of a problem is in there, and I can't find a solution to it, yet. It's harder than Aquanaut, about the same standard of difficulty as Trekboer in fact, so if that was your level you'll enjoy this one.



The game starts with you in a mansion full of interesting exhibits, a quick scout round, examining everything (more than once as has now become a tradition) and you'll have most of the stuff you need to get started. To give a lift to those stuck right at the start try closing doors behind you and also studying a bit of Physics!

The format is standard graphics at the top (with some objects pictured) and text beneath, the vocabulary fine and the keyboard response very good.

There is no HELP option but the SAVE and LOAD work very reliably. However, there is a problem with the adventure, due to what I can only assume are its American origins. By stating the problem I could be accused of giving a big clue to the adventure but it is unfair that one of the key objects cannot be reached until it is realised that in numerals the Americans write their dates month, then day, then year, ie 17/05/86 would be 05/17/86 in American format. I hope I haven't spoiled a part of the adventure for those struggling but I was, to be quite honest, well annoyed when I finally cracked it as I feel that an adventure should have everything within it necessary to solve it and should not rely on pieces of trivia. For the solution to the problem in question I'd like to publicly thank a friend of mine although I have no idea how he knew about it.

To sum up then, another good adventure, marred only by the above mentioned problem, and one to which I shall be returning until I finish it. I hope this team produce more adventures, and soon!

Jason Orbaum

Mountains

Program: Rommel 3-D
Supplier: Microdeal
Price: £5.95

IF THERE'S a sort of game I love reviewing above any other it's arcade copies. The thing is, everyone *knows* what sort of game they are, all I have to say is "Battlezone" or "Rommel's Revenge" and I've saved myself two paragraphs of copy describing the game, and all that remains is to comment on its quality as a copy, and give it a rating.

At the 6809 convention John Symes said to me that this game was simply better than "Rommel's Revenge" and he said if it wasn't he wouldn't have put it out.

The trouble is, I don't think it actually is better than "Rommel's Revenge". Yes, it's faster, and yes there are mountains (one of my gripes at the former was for its lack of mountains) but the game simply doesn't have the right feel of the original and "Rommel's Revenge" has it.

Rommel 3-D is more refined and is by any standard a good game; it offers a choice of colours — yes, you can play this one green on black! — and the sound is slightly better. The problem is it's too fast. It has turned what was originally a tactical battle game on a field, a tense session of guerrilla seek and destroy, into a wham-bam-slam all moving game.

The game also fails to provide all of the enemies of the arcade. It offers tanks, planes and super tanks. I don't know if the planes are the missiles or saucers of the original as I've never lasted long enough to see one — the game is damn fast and the tanks are deadly! No doubt The Expert has blasted his way into the millions on it by now and will inform us all through his next column what they are. (Incidentally, word has reached me that someone thinks I am The Expert, can I state here and now that the day my english degenerates to his level I shall pack up writing altogether!)

So, the game is good, and if you find "*Rommel's Revenge*" boring this could be the version you want but if you want a precise copy of the arcade game this isn't the one!

Jason Orbaum

Down The River

***M Croucher** creates a canoe challenge.*

NOTHING like paddling about in boats. And *Canoe* is . . . an ideal trip on a wet afternoon. You don't have to unpack your kayak, just type in the BASIC loader and hex listings, load and launch.

First, enter the BASIC hex loader, and when complete, type RUN to begin.

The data is split up into eight blocks, and displayed on screen is the block number and address. Type in the relevant line of data and the commas will be displayed after every two digits have been entered, so there is no need to enter them separately. The last number is a check sum and this should be entered after the **?** prompt. If an error has occurred then the address will be displayed again and the line of data will need to be re-entered.

When all the data has been entered the program will be saved to tape, ready for you to use. A copy on tape is available from M. Croucher, 14 Hillingbury Road, Prospect Farm, Havant, Hants PO9 5SE, price £2, if eight blocks of data seems like a lot of typing.

Use CLOADM to load the program. Once loaded, type EXEC to start the game. You have a choice of red or green canoes. For users with black and white TVs, a green canoe only is recommended.

The objective is to paddle your canoe as fast as possible, trying to get through the gates without touching the marker flags. If you reach the finish line in the time allowed you can proceed to tackle the second river. on this river, beware of the banks and rocks as these will sink your canoe. You have three canoes to travel as far as possible.

A bonus point is awarded for each gate successfully negotiated, but all bonus points are lost if a flag is hit.

The right joystick is used to control the canoe. Moving it from right to left will move the canoe forward. Trying to paddle too fast will result in the canoeist getting tired, and the canoe will go out of control.

The time allowed, and the distance between the gates can be changed with the following pokes:

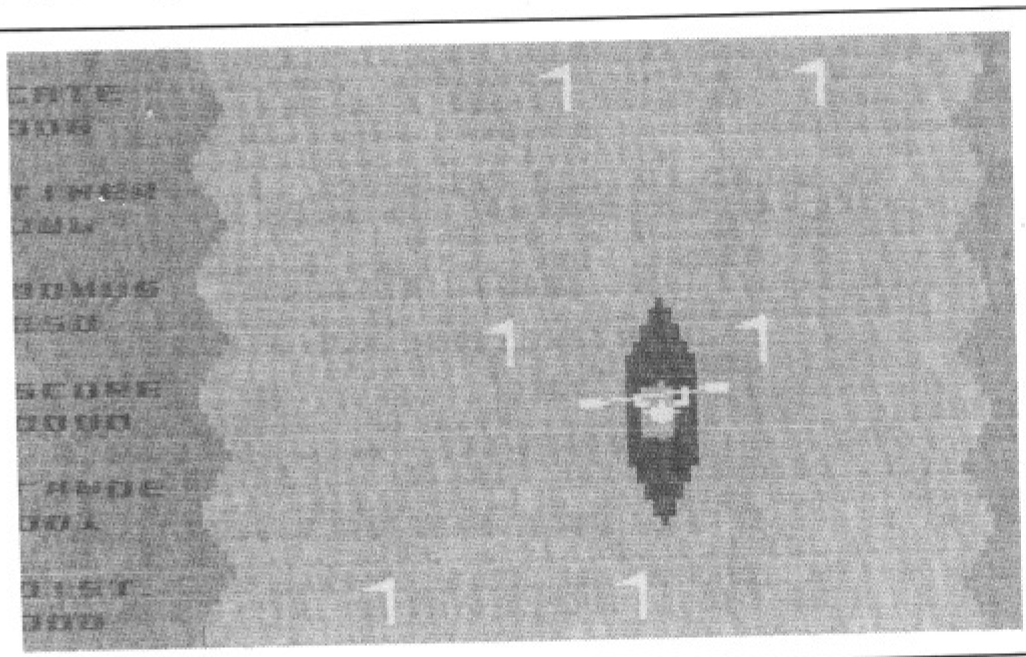
POKE &H3111,No
POKE &H43A7,No

Where No is the distance required between the flags. 0<No<128. Default setting is 64.

POKE &H4725,No
POKE &H472A,No1

Where No and No1 are the first two digits of the time required. Default setting No=1, No1=2.

Once finished, press any key to start a new game.



```
10 PCLEAR 1
20 CLEAR 200,&H23FF
30 FOR BL=1 TO 8
40 READ ST,EN
50 CLS:PRINT "        HEX LOADER":PRINT "-CANOE- BLOCK";BL
60 FOR ADD= ST TO EN STEP 10
70 PRINT HEX$(ADD):CO=0
80 FOR XX= 0 TO 9
90 GOSUB 200:POKE ADD+XX,VAL("&H"+B$)
100 CO=CO+VAL("&H"+B$)
110 PRINT ",";:NEXT:PRINT:INPUT A$
120 IF VAL("&H"+A$)<>CO THEN SOUND 200,3:PRINT "-ERROR- REDO!":GOTO 70
130 NEXT:NEXT
140 CLS:PRINT "SET UP CASSETTE AND PRESS ANY KEY"
150 IF INKEY$="" THEN 150
160 CLS:PRINT "NOW SAVING CANOE!"
170 CSAVEM"CANOE",&H2400,&H5018,&H4A00
180 PRINT :PRINT "CANOE SAVED BYE"
190 END
200 A$=INKEY$:IF A$="" THEN 200
210 IF (A$>"9" AND A$<"A") OR (A$<"0" OR A$>"F") THEN 200
220 PRINT A$;:B$=A$
230 A$=INKEY$:IF A$="" THEN 230
240 IF (A$>"9" AND A$<"A") OR (A$<"0" OR A$>"F") THEN 230
250 B$=B$+A$
260 PRINT A$;
270 RETURN
280 DATA &H2400,&H2F2E,&H3000,&H3805,&H3A00,&H3D2B,&H4000,&H41AF,&H4300,
    &H4723,& H4A00,&H4C98,&H4D00,&H4EB8,&H4F00,&H5017
```

Data Block 1

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2400  8E,0C,00,86,AA,A7,80,8C,24,00,3A1
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2414  20,8C,24,00,2D,F6,8E,0C,00,A7,334
241E  84,A7,01,A7,02,A7,03,A7,04,30,35A
2428  88,20,8C,24,00,2D,EE,86,C0,34,3ED
2432  02,7F,33,79,17,05,88,35,02,4A,252
243C  26,F3,B7,FF,C6,B7,FF,C9,B7,FF,7CA
2446  CB,B7,FF,CC,B7,FF,CE,B7,FF,D0,857
2450  B7,FF,D2,B7,FF,D4,B7,FF,C0,B7,83F
245A  FF,C3,B7,FF,C5,86,E0,B7,FF,22,77B
2464  1A,10,8E,28,FC,BF,01,0D,8E,12,349
246E  40,10,8E,25,85,EC,A1,ED,84,EC,572
2478  A1,ED,02,A6,A0,A7,04,30,88,20,459
2482  A6,A4,26,ED,31,21,8E,0E,80,EC,487
248C  A1,ED,84,EC,A1,ED,02,30,88,20,566
2496  A6,A4,26,F1,31,21,8E,16,00,EC,443
24A0  A1,ED,84,EC,A1,ED,02,A6,A0,A7,67B
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24BE  02,A6,A0,A7,04,30,88,20,A6,A4,415
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24D2  84,EC,A1,ED,02,A6,A0,A7,04,30,521
24DC  88,20,A6,A4,26,ED,31,21,8E,21,406
24E6  40,EC,A1,ED,84,EC,A1,ED,02,A6,660
24F0  A0,A7,04,30,88,20,A6,A4,26,ED,480
24FA  4F,8E,0F,C0,17,04,60,8E,0F,C1,385
2504  4F,17,04,59,8E,0F,C2,4F,17,04,28C
250E  52,8E,17,40,4F,17,04,4B,8E,17,291
2518  41,4F,17,04,44,8E,17,42,4F,17,23C
2522  04,3D,8E,1B,00,4F,17,04,36,8E,218
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2536  17,04,28,8E,1B,03,4F,17,04,21,17A
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2554  0C,8E,22,81,4F,17,04,05,8E,22,25C
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2590  30,FC,FC,FC,30,30,CC,C0,F0,30,630
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25AE  C0,FC,CC,30,FC,00,FC,FC,CC,CC,744
25B8  FC,CC,CC,FC,CC,C0,FC,CC,FC,CC,8AC
25C2  FC,CC,CC,FC,CC,0C,FC,FC,CC,FC,82E
25CC  FC,00,FC,FC,FC,FC,FC,C0,C0,CC,834
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25EA  CC,FC,FC,C0,CC,FC,CC,C0,C0,FC,894
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25FE  CC,FC,FC,00,FC,30,FC,FC,00,CC,6B4
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264E  2F,FE,8C,17,4C,2E,CD,1C,EF,17,439
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Data Block 7

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4D50   00,00,00,AA,00,AA,00,AA,AA,AA,352
4D5A   00,AA,AA,AA,00,AA,00,0A,00,AA,35C
4D64   00,AA,00,AA,AA,AA,00,AA,00,AA,3FC
4D6E   AA,AA,00,AA,AA,AA,00,AA,00,0A,406
4D78   00,AA,00,AA,00,AA,AA,AA,00,AA,3FC
4D82   00,AA,AA,AA,00,AA,AA,AA,00,AA,4A6
4D8C   00,0A,00,AA,00,AA,00,AA,AA,AA,35C
4D96   00,AA,00,AA,AA,AA,00,AA,AA,AA,4A6
4DA0   00,AA,00,0A,00,AA,00,AA,00,AA,2B2
4DAA   AA,AA,00,AA,00,AA,AA,AA,00,00,3FC
4DB4   00,AA,00,AA,00,82,00,AA,00,AA,32A
4DBE   00,00,00,AA,00,00,00,AA,AA,AA,2A8
4DC8   00,00,00,AA,00,AA,00,82,00,AA,280
4DD2   00,AA,00,00,00,AA,00,00,00,AA,1FE
4DDC   AA,AA,00,00,00,AA,00,AA,00,82,32A
4DE6   00,AA,00,AA,00,00,00,AA,00,00,1FE
4DF0   00,AA,AA,AA,00,00,00,AA,00,AA,352
4DFA   00,82,00,AA,00,AA,00,00,00,AA,280
4E04   00,00,00,AA,AA,AA,00,AA,AA,AA,3FC
4E0E   00,AA,00,A0,00,AA,00,AA,AA,AA,3F2
4E18   00,AA,00,AA,00,AA,AA,AA,00,AA,3FC
4E22   AA,AA,00,AA,00,A0,00,AA,00,AA,3F2
4E2C   AA,AA,00,AA,00,AA,00,AA,AA,AA,4A6
4E36   00,AA,AA,AA,00,AA,00,A0,00,AA,3F2
4E40   00,AA,AA,AA,00,AA,00,AA,00,AA,3FC
4E4A   AA,AA,00,AA,AA,AA,00,AA,00,A0,49C
4E54   00,AA,00,AA,AA,AA,00,AA,00,AA,3FC
4E5E   00,AA,AA,AA,00,AA,AA,AA,00,AA,4A6
4E68   00,A8,00,AA,00,AA,00,00,00,AA,2A6
4E72   00,AA,00,AA,AA,AA,00,AA,AA,AA,4A6
4E7C   00,AA,00,A8,00,AA,00,AA,00,00,2A6
4E86   00,AA,00,AA,00,AA,AA,AA,00,AA,3FC
4E90   AA,AA,00,AA,00,A8,00,AA,00,AA,3FA
4E9A   00,00,00,AA,00,AA,00,AA,AA,AA,352
4EA4   00,AA,AA,AA,00,AA,00,A8,00,AA,3FA
4EAE   00,AA,00,00,00,AA,00,AA,00,AA,2A8
4EB8   2A,2A,2A,2A,2A,2A,2A,2A,2A,2A,1A4
```

Data Block 8

```
4F00   00,00,00,AA,00,AA,00,2A,A8,00,226
4F0A   AA,00,00,00,00,00,00,AA,00,AA,1FE
4F14   00,2A,A8,00,AA,00,00,00,00,00,17C
4F1E   00,AA,00,AA,00,2A,A8,00,AA,00,2D0
4E28   00,00,00,00,00,AA,00,AA,00,2A,17E
4F32   A8,00,AA,00,00,00,AA,00,AA,AA,350
4F3C   00,AA,00,8A,A2,00,AA,00,AA,AA,3D4
4F46   AA,00,AA,AA,00,AA,00,8A,A2,00,3D4
4F50   AA,00,AA,AA,AA,00,AA,AA,00,AA,4A6
4F5A   00,8A,A2,00,AA,00,AA,AA,AA,00,3D4
4F64   AA,AA,00,AA,00,8A,A2,00,AA,00,3D4
4F6E   AA,AA,AA,00,AA,AA,00,AA,00,A2,49E
4F78   8A,00,AA,00,00,00,AA,00,AA,AA,332
4F82   00,AA,00,A2,8A,00,AA,00,00,00,280
4F8C   AA,00,AA,AA,00,AA,00,A2,8A,00,3D4
4F96   AA,00,00,00,AA,00,AA,AA,00,AA,352
4FA0   00,A2,8A,00,AA,00,00,00,AA,00,280
4FAA   AA,AA,00,AA,00,A8,2A,00,AA,00,37A
4FB4   AA,AA,AA,00,AA,AA,00,AA,00,A8,4A4
4FBE   2A,00,AA,00,AA,AA,AA,00,AA,AA,426
4FC8   00,AA,00,A8,2A,00,AA,00,AA,AA,37A
4FD2   AA,00,AA,AA,00,AA,00,A8,2A,00,37A
4FDC   AA,00,AA,AA,AA,00,AA,AA,00,AA,4A6
4FE6   00,AA,AA,00,AA,00,00,00,AA,00,2A8
4FF0   AA,AA,00,AA,00,AA,AA,00,AA,00,3FC
4FFA   00,00,AA,00,AA,AA,FE,00,FF,00,3FB
5004   FF,00,FF,00,FF,00,FF,00,FF,00,4FB
500E   FF,00,FF,00,FF,00,FF,00,FF,00,4FB
```

Choosing a Disk Drive

A disk drive is a major investment — plan before you buy, advises ***Geoff Ettridge.***

DUE TO the demise of the Dragon as a games machine, many loyal users may be tempted to buy disk drive bargains appearing in various computer magazines. However, there is more to a bargain than the price; factors such as the suitability of the equipment to perform the tasks required of it, availability of software and its compatibility with other systems must also be considered. This is where the enthusiastic amateur can become unstuck through lack of knowledge. There is little written information and what is available tends to be in the form of snippets in articles or advertisements. There is then a need to collate and present the pieces of information gleaned from these various sources to help the less well informed among us to make a more objective choice. Judging by the standard of articles in *Dragon User* many readers may find this contribution simplistic, but then we all need some light reading from time to time!

The System

There are three parts to a disk drive system to be considered:

(a) The disk drive.
(b) The disk operating sytem (DOS).
(c) Software.

Although I will consider each separately, the system as a whole needs to be designed and evaluated against the particular tasks that it will be expected to undertake.

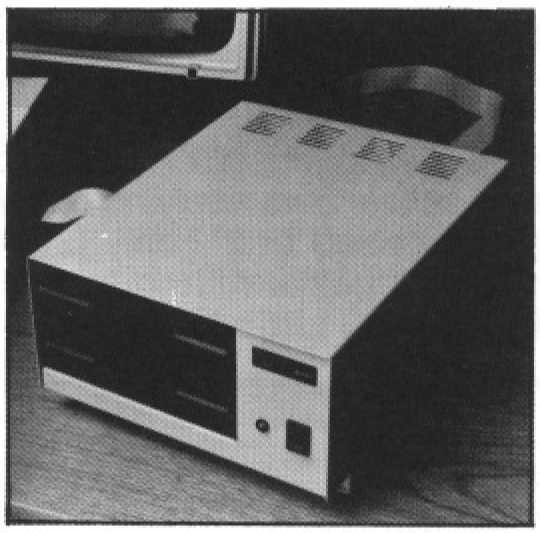
Before looking at disk systems it is wise to ensure we appreciate the benefits of disks over cassette tapes for storing data and programs.

(a) Files are read and written to disks far faster. A disk rotates at 300 rpm.
(b) As files are stored in concentric rings on disks it is possible to directly access files, whereas a tape needs to be subsequently searched.
(c) A disk system writes and keeps a catalogue or directly of the files on each disk.

The disk system therefore comes into its own when considering the handling of data files. Everyone who has attempted to use cassette data files has probably experienced errors arising from the slow acceleration of the tape record or the tedium of extending the duration of the leader tone. No such problems with disk drives. Different files of data can be accessed speedily and if the data was written to disk as a random file it is possible to jump around the file for specific items. This type of random access file allows for parts to be updated, whereas a cassette data file would need to be totally re-written.

The simplest analogy for comparing disk and tape storage is to compare an LP with a music cassette. Once a track on an LP has been chosen the arm can be moved directly to that track. When another track is required the arm can be moved to the new location. It is difficult to perform the same regime with a tape as it is difficult to identify where one track ends and another starts. Although the higher speeds of fast forward and rewind can be used to move to a new track, the tape still needs to be sequentially searched.

Now for some definitions. A disk can be single or double sided and can be either single or double density. (Quad density is also available but I have yet to see any suggestion that it can be used on a Dragon system.) The number of sides needs no explanation except than to confirm that a double sided disk can store files on both sids so long as the disk drive being used is capable of such a task. The density of a disk affects the amount of data that can be stored on the disk. The greater the density the closer the information can be written on the disk and consequently the more data it can store.



Before a disk can store data it needs to be "formatted". This uses some of the storage capacity of the disk, so it is advisable when comparing two different systems to ensure that the formatted capacities are compared. The formatting of the disk results in it being divided into tracks and sectors. The disk operating system (the DOS) also writes essential information on the disk which will be used by the drive to find the desired programme or data file when the system is used. With the tracks and sectors numbered and a CATalogue or DIRectory on the disk the drive can move speedily to the locations where the data is stored.

Each DOS system will format a disk differently, affecting the capabilities of various systems. The formatting of a disk also erases all data stored on it. It is therefore not possible to re-format a disk for another DOS without losing your data or files.

Now to consider the three principle parts of a disk system: The drive, the operating system (DOS) and the software.

The Disk Drive

The task of the drive is largely self-evident from the above. It needs to rotate a delicate piece of material, the disk, at high speed and to be able to read and write data on it at very precise points. The drive is therefore a precision instrument. This needs to be remembered when considering the purchase of a second-hand machine. A drop, or ham-fisted exploration by an inquisitive user, could have caused damage which could be expensive to rectify. Before purchasing a second-hand disk drive, see the system format a disk, write data to it and read it.

Some drives such as Dragon drives are only able to use one side of a disk. Double sided disks can be used in the drive but only one side will be used. This effectively halves the amount of information that can be stored on the disk. Double sided drives such as some of the Cumana models are able to use both sides of the disk but some problems can arise as a consequence of the DOS which means the double sided capacity cannot be used. This will be considered below under disk operating systems but generally this is not a great hindrance if the 'double sided' drive is able to format a single sided disk when required. Again the watch word is to check and if the system is able to format both type of disk then the versatility of the drive is enhanced.

When formatted, a disk is divided into tracks. The standard choice is either 40 or 80 tracks per disk, the 80 track offering twice the storage capacity of a 40 track disk. The number of tracks that can be formatted on a disk is dependent on the characteristic of the drive, the DOS and the disk. Even if the disk and the DOS is double density a 40 track drive will not be able to format or read an 80 track disk. As most software is sold on 40 track disks it is important to check that an 80 track drive is able to read a 40 track disk before it is purchased.

To have the best of both worlds, high storage capacity plus being able to use a range of software it is possible to find drives which are 40/80 switchable. The only problem posed by such drives is that the operator must remember to switch between modes for the differently formatted disks. Another solution could be to check that the software houses you use have the capacity to transcribe their 40 track software on to 80 track disks if requested.

Whether to purchase a single or dual drive is decision based on expense rather than the primary task that the disk system is required for. There are various systems on the market and to make a choice purely on cost could result in undermining the usefulness of your disk system. By having a dual system it is possible to designate one drive as a 'system' drive which will read the software being used while the other could be the 'work' drive which would store the data being used. A simple example is to consider a word processing package. The first drive could contain the program being used plus ancillary files such as a spell check while the other could hold files of documents that have been, or are being, prepared.

If a vast amount of storage space is not required it is maybe more convenient to operate with two single sided than one double sided drive.

Disk Size

The final aspect of the drive I propose to consider is the size of the disk. Mike Jones (*Computer Age*, January 1986) examined yet another scourge of home and business users alike, INCOMPATIBILITY. There are currently three main sizes of disk at present, 5¼ inch, 3½ inch, and 3 inch. Because of improved disk technology all three sizes hold approximately the same amount of data. The 5¼ inch disk is "floppy"; the casing is not rigid and the disk is vulnerable to damage through its exposure at the read/write slot. The 3 inch and 3½ inch disks are encased in a more rigid cover and the read/write slot is protected by a shutter which is opened as the disk is inserted into the drive. Some 3½ inch drives are compatible with 5¼ inch disk operating systems but again the watch word is to check the compatibility before purchase as the design of the drive maybe different, ie it may rotate the disk at an incompatible speed.

Making the choice of disk size is difficult, with much conflicting advice. The smaller disks are more solid but this could result in insufficient tender loving care being given, enhancing the risk of damage. Mike Jones after discussing the relative merits of the different size disk felt that the 3½ inch format held the most promise for longevity of fashion.

As far as Dragon users are concerned, *Dragon User* (September 1985) reported that Eurohards were planning to exend the range of Dragon disk drives available from the present single sided 40 track format. Whatever changes that are proposed to the range Eurohards were reported as intending to remain with the 5¼ inch disk.

If you propose to purchase a drive other than a 5¼ inch check on the availability of software. Check also, if you are not purchasing a total package, that the drive is compatible with the disk operating system you proposed to use.

Operating Systems

Disk Operating Systems (DOS) appear to

(1) ROM systems which interface with resident BASIC by adding disk handling commands, ie Dragon, Delta and Cumana systems.

(2) ROM systems which replace the ROM BASIC of the Dragon with a totally new system, ie the Plus System of Andtek Data Design.

(3) Software-based systems such as FLEX and OS9.

The ROM-based systems offer, to a varying extent, facilities beyond those necessary for a disk interface by adding some utilities to BASIC. For instance Cumana and Dragon DOSs add such commands as AUTO for automatic line numbering, a BEEP command and WAIT to introduce a pause in a programme, a useful alternative to FOR/NEXT loops. These additions are hardly sufficient reason to purchase the system, but represent 'a little candy'.

The Andtek system, however, makes significant changes to the way the Dragon performs by adding new commands and enhancing the screen display with green on black and 80 columns. (See *Dragon User*, November 1985 for a review.)

The software systems require a ROM system to be loaded. The ROM DOS must have a 'BOOT' command or equivalent which will load sectors of the disk which then takes over the operation of the system.

The software systems are expensive but FLEX and OS9 are extremely professional and sophisticated making the operation of the total system much more friendly. They also offer a 'way in' to serious software packages.

It is not necessary to have FLEX or OS9 to use your disk system seriously but powerful software has been written for both these systems so identify the prime tasks you wish to use your disk system for, find the software which will meet them and this may then indicate one of these systems are necessary.

If FLEX is chosen a Dragon 64 is necessary unless the PLUS cartridge mentioned above is used which is able to run FLEX on Dragon 32. An aspect of FLEX which may be attractive is that software that runs with FLEX will run on any machine which uses it, for instance the BBC. For reviews of FLEX see *Dragon User*, February 1985 and September 1985.

Software

A problem which may crop up if using Cumana or Dragon DOS is that it is unable to 'BOOT' a double sided disk. This should not pose any problems, so long as you remember to format a single sided disk when constructing a new system disk.

Unless you are a skilled and addicted programmer without interest in software produced by others you will need to be sure that the desired software is available for the system you propose to use. Most games and serious software appears to be available for Dragon and Delta DOSs. More recently Cumana DOS has increased its profile since they switched from Delta DOS to providing their own with their drives. Jason Orbaum, *Dragon User*, February 1986, reported from the 6809 show that Cumana DOS is not true Dragon DOS although it is compatible with it. This would suggest that software that will run on Dragon DOS will also run under the Cumana system. However, check your version of Cumana DOS, the V2.0 appears to be more compatible than earlier versions. Again, as there is no effective antidote to incompatibility it is advisable to ask and perhaps check for yourself the compatibility of the software and the DOS that you are using or propose to purchase.

Pre-purchase research is never a waste of time when considering the cash (or credit!) investment you may be making. There is no point in buying a 3½ inch drive, even if it is compatible with a 5¼ inch DOS if software houses only supply their programs on 5¼ inch disks.

The cost and availability of software needs also to be taken into account. For instance, there is more software available to run with FLEX. However a recent advertisement carried in DRAGON USER Mar 86 offered OS9 software at very competitive prices compared to the 'recommended retail price'.

Conclusions

It is a sad reality that Dragon support could become extinct in this country. The precarious economic environment in which the small computer firms operate is such that their demise could one day sound the death knell for others. There is therefore some wisdom in investing in equipment and software that can be used with other computer systems should this become necessary. Without checking all the combinations, which is not realistic because of the large number it is possible that inaccurate, inappropriate and biased advice could be obtained. But questions such as "will the disk drive operate with the DOS of another computer?" or "will software that runs under Dragon FLEX operate with FLEX on other systems?" may offer some enlightment which could help you ensure your investment could be partly salvaged should the Dragon breathe its last fiery breath.

Throughout this "Thomas Cook" tour through disk drives and ancillary subjects the advice that should be evident is to take a wholistic approach. Identify the tasks you predominantly wish to undertake, look at the software and what it requires, and so far as possible look into the future to ensure you are not investing in obsolete equipment. Lastly, question, check and observe before parting with hard earned cash so that when you are 'all tooled up' all systems are ready to go.

Good luck for successful bargain hunting!

If you've got a technical question write to Brian Cadge. Please do not send a SAE as Brian cannot guarantee to answer individual inquiries.

Dragon Answers

Error

I HAVE a Dragon 32 and a Star printer. I was playing with them when a message came up: ?DN ERROR. I looked it up on my list, but I couldn't find an explanation. Could you help please?

Daniel Lawrence
26 Lea Street
Lindley
Huddersfield
West Yorks
HD3 3LS

THE 'DN Error' stands for 'Device Number Error' and occurs if the channel number given in an OPEN, CLOSE, PRINT or INPUT command is invalid (ie if it is not −2, −1 and 0). Unfortunately, this error is not noted in the Dragon manual.

If you have a disc drive, then the error can also be caused by entering an invalid drive number.

Extra Poke

I AM currently writing an adventure game for my Dragon 32. However, I have now run out of memory and the game is uncompleted. I remember a POKE in a magazine which gave the user an extra 6K. Could you tell me this POKE, and whether or not it needs to be entered before loading?

David Eggleden
9 Tithe Road
Chatters
Cambs
PE16 6SL

THIS is one of those questions that come up more regularly than others on this page. The PCLEAR command can be used to reserve and release RAM used for the graphics modes. Typing PMODE 0,1:PCLEAR 1 will release all but one graphics page and allow the RAM to be used for your Basic programs. Unfortunately, it is not possible to enter PCLEAR 0 as this returns an error.

However, it is possible to achieve the same effect as PCLEAR 0 by typing the following:

POKE 25,PEEK (188):POKE PEEK (188)*256,0:NEW

This will take into account if a disc drive is attached and should be entered before loading any program that is to use the extra RAM.



On/Off

I HAVE two programs which run lengthy routines during which I want to switch off the TV I use with my Dragon 32. I intend to construct a small audio amplifier so that I can still use audio signals to indicate completion of the process.

I know that the audio signal is available from the monitor socket, but is there any DC available at a socket or must I build a separate power supply for the amplifier? If DC is available, at what voltage? Can you also please tell me the audio signal level at the monitor socket?

G. T. Denton
12 Falconwood Road
Addington
Croydon
CR0 9BB

THERE is no power source available at the monitor socket; however, you can get +5V on pin 5 of the joystick ports, and pins 2 and 4 of the Centronics port. The audio signal at the monitor socket conforms to the normal DIN standards.

Scroll

I HAVE been trying to write a machine code routine to scroll the PMODE 3/4 screen horizontally. I have tried two obvious methods:

1) ROR/ROL . . . (too slow)
2) Moving the screen byte by byte (too jerky)

Please could you tell me how the fast, smooth scrolling effect in games is achieved?

P. A. Chirico
Freshfields
158 Empingham Road
Stamford
Lincs PE9 2SZ

THERE are a number of different ways of fast scrolling the hires screen. The one I favour is word scrolling syncronised to the frame flyback.

You should write a routine to scroll the screen horizontally a byte at a time (move 16 bits at once using the 'D' register for speed), but wait for the frame flyback pulse before each whole scroll. This is achieved by waiting for bit 7 of $FF03 to change. The result is fast and reasonably smooth horizontal scrolling.

Printer

I HAVE a Silver Reed Colour PenGraph Model EB50 with a built-in Centronics interface. Unfortunately when the PenGraph is connected to my Dragon 32 and is in PRINTER mode (on-line), it responds to the depressing of certain keys on the Dragon keyboard without any command such as PRINT#-2 being input to make it do so. This only happens with four keys, namely 5, 6, full-stop and hyphen, plus the SHIFTed versions of these same keys. When 5 or hyphen is pressed, a space is printed out by the PenGraph. When 6 or full-stop is pressed, the symbol @ is printed out either once *or* twice randomly. Any other key pressed immediately after one of these four keys may cause a repeat of the space or @ symbol being printed out. Can you tell me why this should happen?

Mike Whetstone
16 Thorngate Wynd
Barnard Castle
Co. Durham

THE same PIA port is used for both the Centronics printer interface and for reading the keyboard. Whenever the keyboard is read the values on the data lines of the printer port will change. However, the printer should not respond to this as the 'strobe' line will be high. The printer will only print the character at the port when it is 'strobed' (the strobe line goes low then high).

Your problem seems to be with this strobe line. The most likely cause is the printer lead. I suggest you test the lead with another printer before suspecting the computer or printer.

Video

I AM attempting to write an article, ultimately for submission to *Dragon User,* about the use of the video recorder for saving programs from computer. At present the video and audio are fed into the video from the 'monitor' socket. A game, for example, can then be recorded on the video as it is played.

Using the cassette socket, the audio output CSAVE records to the 'audio dub' input on the video, and is fed back on CLOAD from the audio output DIN socket on the rear of the video. The recorded picture can then be wound back to the beginning and the program CSAVED onto the sound channel.

All the child wishing to load a game then needs to do is to 'SEARCH' through the video tape until he *sees* his game and then CLOAD it into the computer.

The problem is that many video machines do not posses an 'audio dub' facility, so what is needed is for the audio output present on the cassette socket on CSAVE to be also present on the 'monitor' audio output at the same time, which is not at present. Could you kindly advise me as to whether there is a software POKE or something to redirect CSAVE audio to the 'monitor' socket? I can find no mention of the 'monitor' socket in any of the literature I have at present.

Nick Brierley
5/6 Waterfall Cottages
Marsden
Huddersfield
HD7 6NQ

YOU can cause the CSAVE tones to be sent to the monitor socket by typing the following:

POKE 65315, (PEEK(65315) OR 8):CSAVE "filename"

Presumably, this would be done within a program which is displaying one of its screens at the time.

Journey Planner

Get your Dragon to help you with your holidays with this useful program by ***Dr A Daniel***

THIS IS a totally original idea to help you plan long car journeys. It times and costs them according to information you add from maps and guide books. As it stands it has been designed for continental motoring holidays with overnight hotel stops but I have listed below certain key lines which must be altered to suit your own requirements.

I have used it for several years and found it very helpful and it is also fun to use on imaginary journeys.

Having planned your trip, you can save it on tape, alter it, add in extra sections from tape or print it out.

As it is rather a long program I will send it for £1.10 or if you send an empty cassette and suitable stamped and addresed envelope to 8 Barnfield Road, Riverhead, Kent, TN13 2AY — you can have it free.

Whether you type it or send for it do read the Rems in lines 20, 30, 220, 230, 280 and 430 which contain essential information.

Here now is a note of the important lines and a schedule to explain the general arrangement.

Line No

390 — contains calculations for the average speed on different types of road as stated in the schedule.

430 — calculates the cost of travel to the nearest pound at 4p per km or £2 per 31 miles. This can be adjusted for you may wish to work in miles or reset the costing to suit your car.

460 — one hour for lunch may be too little or too much. You can alter this remembering *TH* is the hour variable and *TM* the minute one. *LU* is just a flag set to make sure you don't keep having lunch throughout the afternoon.

820-850 — When the program is running and you wish to correct an entry, you must reset the time to the time of departure from the previous town which you will find displayed on the screen. Make sure you know which day you are in too.

980 — This is how my family travel but you must suit yourselves. The 10 is added in line 1000.

910 and 960 — You may wish to put camping site instead of hotel.

The printer instructions are for a TANDY CGP115. Lines 1500, 1540 and 1550 may not suit other makes. In any case, enjoy planning your holiday!

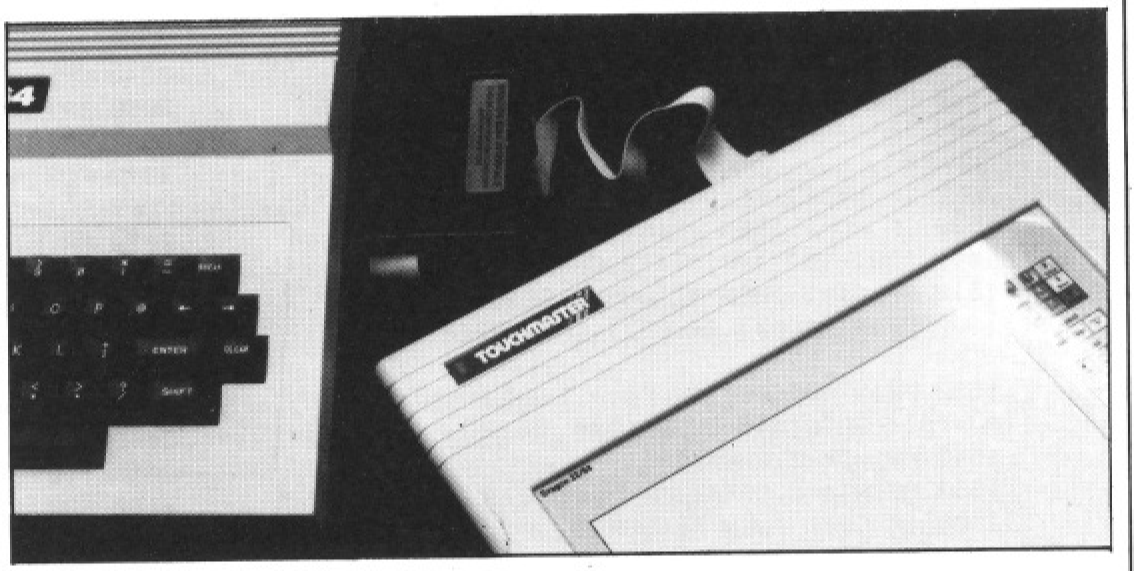
```
10 ' HOLIDAY BY ANTHONY DANIEL - 17/3
/86
20 ' BEFORE STARTING ADJUST FORMULA F
OR OBTAINING THE CORRECT DATE OF YOUR HO
LIDAY IN LINES 1690 AND 1700 - 'Q' REPRE
SENTS THE TRUE DATE, 'DY(A)' IS THE NUMB
ER OF DAYS YOU HAVE BEEN AWAY"
30 ' YOU MAY ALSO WISH TO ENTER SOME
OF THE LINES BETWEEN 140-230 AS FIXED VA
RIABLES INSTEAD OF INPUTS WHICH HAVE TO
BE FILLED IN EVERY TIME THE PROGRAMME IS
 RUN, AS YOU WILL PROBABLY ONLY PLAN ONE
 HOLIDAY AT A TIME
40 PCLEAR1: CLEAR 12000
50 DIMT$(100),DD(100),DY(100),B$(100)
,H$(100),CC(100),AD$(100),LL$(100)
60 CI=0
70 CLS:PRINT
80 PRINT"DO YOU WISH TO rETRIEVE INFO
RMATION FROM CASSETTE OR PLAN A nEW TRIP
? PRESS 'R' OR 'N'
90 X$=INKEY$:IFX$=""THEN 90
100 IF X$="N" GOTO140
110 IF X$="R" GOSUB2180ELSE90
120 GOSUB1280
130 GOTO1120
140 PRINT"ENTER STARTING TIME"
150 INPUT"HOURS"; TH: TH=INT(TH)
160 IF TH=0 THEN 150
170 INPUT"MINUTES"; TM: TM=INT(TM)
180 A=1: X=A
190 INPUT"STARTING DAY";DY(A)
200 IF DY(A)=0 THEN DY(A)=1
210 IF DY(A)=1 THEN 220 ELSE 260
220 INPUT"METHOD OF TRAVEL";ZZ$: ' E.G
 IF CROSSING CHANNEL PUT 'BY CAR FERRY'
OR 'FLY DRIVE' - SEE LINE 1810 FOR USE O
F ZZ$
230 IF ZZ$<>"" THEN INPUT"BASIC COST O
F TRAVEL";BC: ' THIS REFERS TO THE COST
OF FERRIES, MOTORAIL OR OTHER TRANSPORT
REFERRED TO IN ZZ$
260 CLS4: PRINTTAB(4)"IN THIS SECTION
YOU ENTER   EACH TOWN YOU WISH TO VISIT,
 ITSDISTANCE (IN KM) FROM THE LAST  PLAC
E,THE TYPES OF ROAD YOU WILLBE TRAVELLIN
G ON, AND ANYTHING  OF INTEREST THERE OR
 ON THE WAY":PRINT
270 GOSUB1690
280 PRINTA:INPUT"NAME TOWN";T$(A): IF
T$(A)=""THENT$(A)="NONE": 'IF YOU ENTER
AN 'X' YOU CAN RESET THE TIME AND DAY OF
 TRAVEL
290 IF T$(A)="X" THEN GOSUB820:GOTO280
300 RH=TH: RM=TM
310 INPUT"DISTANCE";DD(A)
320 INPUT"MOTORWAY DISTANCE";DM
330 INPUT"EXTRA SLOW ROAD DISTANCE";DS
340 IF DD(A)=0 AND (DM>0 OR DS>0) THEN
 DD(A)=DM+DS
350 DR=DD(A)-(DM+DS)
360 LINEINPUT "FEATURES OF INTEREST ";
B$(A):IFB$(A)=""THENB$(A)="NONE"
370 B$(A)=B$(A)+" - ROADS M="+STR$(DM)
+" O="+STR$(DR)+" S="+STR$(DS)
380 INPUT"HOW LONG DO YOU WANT THERE I
N HOURS";SS
390 TM=TM+((DM*2)/3)+((DR*6)/5)+(DS*3)
400 XX=INT(TM/60)
410 TH=TH+XX:TM=INT(TM-XX*60)
415 IF TH>23 THEN TH=TH-24: AY=1
420 T$(A)=T$(A)+" ARRIVING AT"+STR$(TH
)+STR$(TM)
430 CI=INT(DD(A)/25+DM/50): ' THE FRAC
TION DM/50 REPRESENTS FRENCH AND ITALIAN
 MOTORWAY CHARGES. IF YOUR HOLIDAY IS EL
SEWHERE YOU CAN CUT IT OUT ALTHOUGH MOTO
RWAY DRIVING IS A BIT MORE EXPENSIVE ANY
WAY
440 CLS: PRINT@100,T$(A)
450 TH=TH+INT(SS): TM=TM+(SS-INT(SS))*
60: TM=INT(TM):PRINT
452 IF TM>60 THEN TM=TM-60: TH=TH+1: G
OTO452
454 IF TH>23 THEN TH=TH-24: AY=1: GOTO
480
460 IF TH<23 AND TH>12 AND LU=0 THEN T
```

```
H=TH+1: PRINTTAB(5)"ONE HOUR HAS BEEN AD
DED FORLUNCH":PRINT: LU=1
  470 IF TH>18 THEN 890
  480 PRINT"TO STOP FOR NIGHT PRESS 'N'
ELSE PRESS 'C'"
  490 IF LU=1 THEN PRINT"TO CUT OUT LUNC
H HOUR PRESS 'H'"
  500 PRINT"TO RE-DO THE LOT PRESS 'X'"
  505 PRINT:PRINT"TIME IS NOW";STR$(TH);
STR$(TM)
  510 NN$=INKEY$: IF NN$="" THEN 510
  520 IF NN$="X" THEN TH=RH: TM=RM: T$(A
)="":B$(A)="": TH=RH: TM=RM: GOSUB2580:
GOTO280
  530 IF NN$="H" AND LU=1 THEN TH=TH-1:
PRINT"TIME IS"TH;TM: LU=2: GOTO510
  540 IF NN$="N" THEN 890
  550 T$(A)=T$(A)+" DEPARTING AT"+STR$(T
H)+STR$(TM):PRINT
  560 IF NN$="C" THEN CC(A)=C1:GOTO570 E
LSE 510
  570 IF CI=1 THEN B=A: GOTO670
  580 M=DY(A)
  585 IF AY=1 THEN AY=0: M=M+1
  590 A=A+1
  600 DY(A)=M: X=A
  610 GOTO280
  620 CI=1: CO=A: CLS2:PRINTTAB(3)"PRESS
 THE NO. OF THE TOWN    FROM WHICH YOU W
ISH TO BEGIN    ALTERATIONS"
  630 PRINT:PRINTTAB(3)"IF YOU WISH TO C
UT OUT A TOWNENTIRELY ENTER NO. AS A NEG
ATIVE": PRINTTAB(3)"TO INSERT AN EXTRA T
OWN OR   TOWNS ADD ONE OR MORE HUNDRED T
OTHE NUMBER OF THE TOWN"
  640 PRINT:PRINTTAB(3)"PRESS ENTER TO L
IST TOWNS":PRINT:
  650 PRINTTAB(3)"PRESS CLEAR TO FINISH"
:PRINT
  660 PRINTTAB(3)"PRESS SPACEBAR TO ENTE
R NO.";: B=0: GOTO690
  670 PRINTB;" ";T$(B)
  680 IF B>X THEN B=0
  690 L$=INKEY$: IF L$="" THEN 690
  700 IF B=0 THEN PRINT
  710 IF L$=CHR$(12) THEN A=X: CI=0: GOT
O1120
  720 IF L$=CHR$(32) THEN 750
  730 IF L$=CHR$(13) THEN B=B+1: GOTO670
  740 GOTO690
  750 INPUT"TOWN NO";C
  760 IF C<0 THEN C=C*-1: GOSUB2420: GOT
O670
  770 IF C>100 THEN GOSUB2490: GOTO670
  780 IF C<1 OR C>X THEN 750
  790 CLS2:IF C>1 THEN A=C-1: PRINTT$(A)
:PRINT
  800 A=C: GOSUB1370
  810 H$(A)="": CC(A)=0:GOSUB820: GOTO28
0
  820 INPUT"TIME CORRECTION";JH,JM
  830 IF JH>0 THEN TH=JH: TM=JM
  840 INPUT"DAY CORRECTION";HY
  850 IF HY>0 THEN DY(A)=HY
  860 GOSUB1690
  870 RETURN
  880 B=1: GOTO670
  890 CLS2: IF TH>18 THEN PRINT"IT'S ABO
UT TIME YOU STOPPED FOR THE NIGHT"
  895 IF AY=1 THEN AY=0: HD=DY(A)+1 ELSE
 HD=DY(A)
  900 PRINTUSING" THE TIME IS ## ## ON D
AY ##";TH,TM,HD
  910 PRINTTAB(5)"DO YOU WISH TO MAKE A
NOTE OF A HOTEL?"
  920 PRINT"IF NOT YET CHOSEN TYPE 'NYC'
"
  930 PRINT"IF TOO EARLY TYPE 'NO'"
  940 LINEINPUT "NAME ";H$(A)
  950 IF H$(A)="NO" OR H$(A)=" NO" THEN
H$(A)="": GOTO480
  960 H$(A)="ARRIVAL AT HOTEL "+H$(A)+"
AT"+STR$(TH)+STR$(TM)
  970 INPUT"TOTAL DINNER, B.+B. COST";BB
  980 PRINTTAB(2)"TEN POUNDS HAVE BEEN A
LLOCATEDFOR YOUR PICNIC TOMORROW. IF YOU
WISH TO ADD ON ANY OTHER EXPENSEYOU MAY
HAVE HAD DURING THE DAY SUCH AS FARES OR
 ENTRANCE FEES  DO SO NOW"
  990 INPUT XC
 1000 C2=C1+XC+BB+10
 1010 H$(A)=H$(A)+" COST"+STR$(BB)+" EXT
RAS"+STR$(XC+10)
 1020 PRINTTAB(4)"YOUR TOTAL COSTS TO DA
Y ARE"C2: LU=0
 1030 IF CI=1 THEN B=A: GOTO670
 1040 PRINTTAB(4)"NOW INDICATE THE TIME
FIRST IN HOURS THEN IN MINUTES WHEN   YO
U WISH TO START NEXT MORNING."
 1050 PRINT"BUT ENTER 'X' TO REDO THIS P
ART  OR 'H' TO FINISH OFF HOLIDAY.": CC(
A)=C2
 1055 INPUT"HOURS";SH$: IF SH$="X" THEN
H$(A)="": GOTO 890
 1060 IF SH$="H" THEN 1760 ELSE SH=VAL(S
H$)
 1070 IF SH<1 OR SH>24 THEN 1055
 1090 TH=SH
 1100 INPUT"MINUTES";TM
 1110 X=A: N=DY(A)
 1120 CLS5:PRINT@96,""
 1130 PRINT
 1140 PRINTTAB(5)"IF YOU WISH TO EXAMINE
 THE SUMMARY OF YOUR TOUR PRESS 'S'"
 1150 PRINTTAB(5)"IF YOU WISH TO PUT DET
AILS ON TAPE PRESS 'R'"
 1160 PRINTTAB(5)"IF YOU WISH TO TAKE DE
TAILSFROM TAPE PRESS 'T'"
 1170 PRINTTAB(5)"IF YOU ARE DISSATISFIE
D ANDWISH TO ALTER TOUR PRESS 'A'"
 1180 PRINTTAB(5)"TO CONTINUE TOUR PRESS
'C'"
 1190 Y$=INKEY$:IFY$=""THEN1190
 1200 IF Y$="A"GOTO620
 1210 IF Y$="C"GOTO1260
 1220 IF Y$="R"GOTO1990
 1230 IF Y$="T" THEN GOSUB2180
 1240 IF Y$="S" GOSUB1280ELSE1190
 1250 GOTO1120
 1260 GOSUB1580
 1270 GOTO280
 1280 CLS8
 1290 PRINTTAB(4)"INPUT THE NUMBER OF TH
E TOWNYOU WISH TO CHECK.  IF IN DOUBT ST
ART AT 1 AND WORK THROUGH. TO LEAVE DISP
LAY ENTER 0.
 1300 PRINT"BUT FIRST...":GOSUB1850
 1310 IF PA=1 THEN A=A+1: GOTO1320 ELSE
1340
 1320 IF A>X THEN PA=0: GOTO1340
 1330 GOTO1360
 1340 INPUT"TOWN NO."; A
 1350 IF A=0 GOTO1570
 1360 CLS8
 1370 PRINTLL$(A): IF PO=1 THEN PRINT#-2
```

```
,LL$(A):PRINT#-2," (TO) ";T$(A);"  (";A;
")"
 1380 PRINT"JOURNEY TO ";T$(A);"  (";A;"
)"
 1390 PRINT"FEATURES OF INTEREST ";B$(A)
 1400 IF PO=1 THEN GOTO1410ELSE1420
 1410 PRINT#-2,"NOTE:- ";B$(A)
 1420 PRINT"DISTANCE TRAVELLED";DD(A)
 1430 IF PO=1 THEN GOTO1440ELSE1450
 1440 PRINT#-2,"DISTANCE ";DD(A)
 1450 PRINT"COST";CC(A)
 1460 IF PO=1 THEN GOTO1470ELSE1480
 1470 PRINT#-2,"COST";CC(A)
 1480 IF H$(A)="NYC" THEN H$(A)="NOT YET
 CHOSEN"
 1490 IF H$(A)<>""GOTO1520
 1500 IF PO=1 THEN PRINT#-2,CHR$(18):PRI
NT#-2,"M0,-10]":PRINT#-2,CHR$(17)
 1510 IF CI=1 THEN RETURN ELSE GOTO1310
 1520 PRINTH$(A): IF PO=1 THEN PRINT#-2,
H$(A)
 1530 PRINTAD$(A): IF PO=1 THEN PRINT#-2
,AD$(A): GOTO1540 ELSE 1560
 1540 PRINT#-2,CHR$(29)
 1550 PRINT#-2,CHR$(11)
 1560 IF CI=1 THEN RETURN ELSE GOTO1310
 1570 RETURN
 1580 CLS8
 1590 DD=0:CC=BC
 1600 FOR P=1 TO X
 1610 DD=DD+DD(P)
 1620 CC=CC+CC(P)
 1630 NEXT
 1640 AD$(A)=AD$(A)+"TOTAL COST"+STR$(IN
T(CC))+" - TOTAL DISTANCE"+STR$(DD)+" TO
 DATE"
 1650 PRINTAD$(A): IF PO=1 THEN PRINT#-2
,AD$(A)
 1660 IF UU=1 THEN RETURN
 1670 A=X+1: X=A
 1680 DY(A)=N+1
 1690 Q=DY(A)+25: IF Q>31 THEN Q=Q-31
 1700 IF Q>25 THEN L$=" MAY" ELSE L$=" J
UNE"
 1710 LL$(A)="TIME IS"+STR$(TH)+STR$(TM)
+" ON DAY"+STR$(DY(A))+L$+STR$(Q)
 1720 PRINTLL$(A)
 1730 IF PO=1 THEN PRINT#-2,LL$(A)
 1740 PO=0
 1750 RETURN
 1760 X=A: N=DY(A):CLS3:PRINTTAB(5)"YOU
HAVE NOW COMPLETED YOURJOURNEY IN";N;"DA
YS"
 1770 IF PO=1 THEN PRINT#-2,"YOU HAVE NO
W COMPLETED YOUR JOURNEY IN";N;"DAYS"
 1780 CLS3:PRINTTAB(5)"YOU CHOSE TO TRAV
EL ";ZZ$: UU=1: GOSUB1590: UU=0: PRINT:P
RINT"TO PUT THIS INFORMATION IN PRINTPRE
SS 'P' ELSE PRESS ANY OTHER  KEY"
 1790 PT$=INKEY$: IF PT$="" THEN 1790
 1800 IF PT$="P" THEN 1810 ELSE 1820
 1810 PRINT#-2,"YOU CHOSE TO TRAVEL ";ZZ
$ : PRINT#-2,AD$(A)
 1820 CLS: GOTO1120
 1830 IF INKEY$=CHR$(32)GOTO1840 ELSE183
0
 1840 CLS:GOTO1120
 1850 PRINT"FOR PRINT OUT PRESS 'P'"
 1860 PRINT"FOR AUTOMATIC PRINT OUT - 'A
'"
 1870 PRINT"TO CANCEL PRINT OUT - '/'"
 1880 PRINT"ELSE PRESS ANY OTHER KEY"
 1890 PT$=INKEY$:IFPT$=""THEN1890
 1900 IF PT$="/" THEN PO=0
 1910 IF PT$="A" THEN PO=1: PA=1: A=0
 1920 IF PT$="P" THEN PO=1
 1930 RETURN
 1990 CLS0: PRINTTAB(5)"TO STORE TOUR ON
 TAPE, SET RECORDER AND PRESS'Q'": PRINT
"RECORDING";X;" TOWNS"
 2000 POKE144,3
 2010 Y$=INKEY$: IF Y$="" THEN 2010
 2020 IF Y$="Q" THEN 2040
 2030 IF Y$="/" THEN 1120 ELSE 2010
 2040 OPEN"O",#-1,"HOLIDAY"
 2050 PRINT#-1,BC,ZZ$
 2060 PRINT#-1,X,N
 2070 FOR A=1 TO X
 2080 PRINTA;" ";T$(A)
 2090 PRINT#-1,T$(A),B$(A),H$(A),AD$(A),
LL$(A)
 2100 PRINT#-1,DD(A),CC(A)
 2110 PRINT#-1,DY(A)
 2120 NEXT
 2130 CLOSE#-1
 2140 CLS5:PRINT"ALL FINISHED - TURN OFF
 CASSETTE"
 2160 FOR J=1 TO 1000:NEXT
 2170 GOTO1120
 2180 PRINT"YOU ARE AT TOWN";X
 2190 INPUT"START NO:- ";E1
 2200 IF E1<2 THEN E1=1
 2210 IF E1>99 THEN 2180
 2220 CLS0:PRINT"SET RECORDER AND PRESS
'P'"
 2230 PT$=INKEY$: IF PT$="" THEN 2230
 2240 IF PT$="P" THEN 2270
 2250 IF PT$="/" THEN RETURN
 2260 GOTO 2230
 2270 OPEN"I",#-1,"HOLIDAY"
 2280 INPUT#-1,BC,ZZ$
 2290 INPUT#-1,X,N
 2300 PRINTX
 2310 FOR A= E1 TO (E1+X-1)
 2320 INPUT#-1,T$(A),B$(A),H$(A),AD$(A),
LL$(A)
 2330 PRINTA;" ";T$(A)
 2340 INPUT#-1,DD(A),CC(A)    2360 NEXT
 2350 INPUT#-1,DY(A)          2370 CLOSE#-1
 2380 CLS5:PRINT"ALL FINISHED - TURN OFF
 CASSETTE"
 2390 PRINT"TO CONTINUE YOU MUST ENTER S
TARTING TIME": INPUTTH,TM
 2400 IF TH=0 THEN 2390    2420 'DELETION
 2410 RETURN               2430 FOR R=C TO X
 2440 T$(R)="":DD(R)=0:DY(R)=0:B$(R)="":
H$(R)="":CC(R)=0:AD$(R)="": LL$(R)=""
 2450 T$(R)=T$(R+1): DD(R)=DD(R+1):DY(R)
=DY(R+1): B$(R)=B$(R+1): H$(R)=H$(R+1):C
C(R)=CC(R+1):AD$(R)=AD$(R+1): LL$(R)=LL$
(R+1)
 2460 NEXT          2480 RETURN
 2470 X=X-1         2490 D=0
 2500 C=C-100: D=D+1: IF C>100 THEN 2500
 2520 FOR R=X TO (C+1) STEP-1
 2530 T$(R+D)=T$(R): DD(R+D)=DD(R):DY(R+
D)=DY(R): B$(R+D)=B$(R): H$(R+D)=H$(R):C
C(R+D)=CC(R):AD$(R+D)=AD$(R): LL$(R+D)=L
L$(R)
 2540 T$(R)="":DD(R)=0:DY(R)=0:B$(R)="":
H$(R)="":CC(R)=0:AD$(R)="": LL$(R)=""
 2550 NEXT          2580 IF RH<13 THEN LU=0
 2560 X=X+D         2590 RETURN
 2570 RETURN
```

Extra Graphics

He liked the software so much — he wrote his own.
***Peter Whittaker** on the Touchmaster Graphics Tablet.*



HAVING bought a TouchMaster Graphics Tablet, I can agree with Mike Gerrard that it is well worth the price of £52.50 (*Dragon User,* February 1986). When I first bought the tablet, I was quite impressed with the graphics available through the *Multipaint* program, but after a short while I felt that it needed improving.

The program I have written is based around the Dragon 64 with disk drive to obtain a printer resolution of 512 pixels by 384, which is better than the Apple Macintosh at 512 by 342 pixels. The program can easily be converted to work with cassette tape instead of with disks, although the machine code routines will need to be altered to take account of the different graphics screen addresses. The program will also work on the Dragon 32 with the loss of the extra big graphics screen facility.

The Graphics Tablet

The graphics tablet is connected to the Dragon via the cartridge port, but is not patched into Dragon Basic. There is no equivalent of the *JOYSK* command to read the position of a pen on the pad. Instead a short program is needed to read whether the pen is pressing the pad, and if so, where. (Assembler #1. PADCODE.)

Unfortunately, the pad does not use the same resolution as the Dragon's graphics screen (256*192), but has a resolution of 256*256. This means that the pixels are not square in shape. A circle drawn on the pad will look like a squashed egg on the screen unless the Y co-ordinates are suitably adjusted. The program will store the unaltered co-ordinates at *X=PEEK (&H7FC2): Y=PEEK (&H7FC4)* and the modified co-ordinates at *X=PEEK (&H7FC3): Y=PEEK (&H7FC5).*

As listed, the program will read the pad and then set the equivalent pixel on the graphics screen to enable free hand drawing. However, by altering the code, *POKE&H7F74,57* the program will stop before setting the pixel, and the machine code routine can be used to read the position of the pen on the pad for use with other functions.

The Main Program

Type in Listing #1, and save it to tape. If you do not have a disk drive remember to change all the save/load routines from *SAVE A$,3072,9216,41194* to *CSAVEM A$,1536,7680,41194.* Now type in Listing #2, the machine code loader, *CLEAR200,32000,* and then RUN it. Enter the start and end addresses of 32501 and 32715, and then enter the data for *PADCODE.* Type in each line of 16 digits, and then press enter. Then enter the total given at the end of the line. When you have typed in all the data, save it to tape/disc, with *CSAVEM "PADCODE", 32501, 32715, 32501.* Now do the same with the *BIGSCREEN* data, using 32241 and 32495 as the start and end addresses. You can now rewind the tape, *CLOAD,* and *RUN* the program.

When *RUN,* the program loads in the code, and then displays the graphics screen whilst the various variables are initialised. When the program is ready, the top left corner of the screen will be inverted, and then restored. (Black to white and back again.) This inverted area of the screen refers to the area of graphics memory currently being addressed by the pad.

Unlike Multipaint, the program is controlled from the keyboard, since the whole surface of the graphics tablet is used for drawing. Each time a key is pressed, the current screen is backed up to graphics pages 5 to 8. This allows for the inclusion of an Oops routine, called by pressing the ‹**O**›, which will delete everything entered since the last key press, and help to correct any mistakes. Pressing the ‹**C**› will save the current screen to an array, so that it can be restored ‹**R**› after several separate drawing operations.

Press the pen on the pad, and any free hand drawing will be displayed on the screen, to the scale of the original inverted box. To facilitate detailed drawing, there are four different drawing sizes available, and these are called by pressing the number keys from ‹**1**› to ‹**4**›.

‹**1**› will set the pad to draw over the whole screen, ‹**2**› will draw on a quarter screen, ‹**3**› on a sixteenth, and ‹**4**› on a sixty-fourth. Each time the scale is changed, the program will invert and restore the relevant area of the screen. Whilst the full scale ‹**1**› will allow drawing over the whole screen, the other scales require the drawing area to be positioned over the appropriate area of the screen. This is done by pressing any of the four narrow keys. Each time the drawing area is moved, the program will invert the relevant area of the screen to show where the drawing area is now positioned.

The program is error trapped to prevent the drawing area from running over the edge of the screen. To help position the pen in the right place when using the various drawing scales, the ‹**F**› key will place a frame over the drawing area. This eight by eight grid will be scaled to show the area covered by the whole pad, and will be displayed until another key is pressed.

There are several different brush types available as an alternative to the freehand pixel mode selected by default. These routines are called by the ‹**D**› key, and then give a choice of circles, lines or boxes. Circle radius, and box/line x/y offsets are selected, and then the program returns to the graphics screen. Freehand drawing will now use the selected brush type. To return to the main program press the ‹**Q**›, which will also return you to the pixel drawing mode.

The next available function is the Dragon's *GET* and *PUT* command. This will get an area of screen memory into an array, and then allow it to be copied to any other area of the screen. Press the ‹**G**› to call the *GET* routine. Two lines will be drawn from the pen position, one off to the right hand border, and one to the bottom of the screen. This is to show the top and left hand edges of the area which will be got. When the pen has selected the correct point, press Enter to lock it in.

Now, as the pen is moved around the screen, the program will draw a box from the first point to the current point, indicating the total area which is going to be copied to the array. This area must not exceed 10000 pixels (10×1000, 100×100 etc) or it will be too big for the array. When the box is correctly positioned, press Enter again to copy the picture. If the area is too big for the array, it will not copy across and the program will continue to wait for the second

point to be selected. The routine can be aborted by pressing the ‹Q› key.

Having copied a picture into the array, it can be recopied back to the screen by pressing either the ‹P› or ‹B› keys. The ‹P› key will put the array back on the screen, wiping out whatever background it covers, whilst using the ‹B› key will place both the array and the background on the screen. Whichever key is used, the picture will flash on and off wherever the pen is placed. Press Enter to select the desired position, or the ‹Q› to quit the routine. The array will keep the same picture in it, so there is no need to reGET it each time.

The next function, called by pressing the ‹A› key, prints on screen any letters entered via the keyboard. When called, the routine will first ask for a scale at which to draw any letters (1-16), and then ask for an angle at which to draw the letters, up, down, left, or right (0-3). The program will then display two crossed lines to mark the pen position from which the letters will be drawn. When the pen is in the correct position just start to type, and the program will draw the letters on screen. Press Enter to finish the text input. If you make a mistake in your typing, finish the text routine, and then press the ‹O›ops key to delete it.

The last drawing routine provided is called by the ‹W› key, and accesses the Dragon's *LINE*, box and *CIRCLE* commands. The program will ask for which of the three options you want, and then return to the graphics screen. Position the pen to select the first point (end of a line or centre of a circle), and press Enter. When the pen is placed on the screen, the program will draw in the appropriate shape between the two points. Press Enter to select any given shape, and the program will fix it in the display, and start on another. In this way, for example, several concentric circles can easily be drawn. To quit the routine, you need to press the ‹Q›.

All of the above functions are fully available on the Dragon 32, but the following routine is not. When in 64K mode, the Dragon uses all 64K or RAM chips, but whilst it is in 32K mode, only half of these are used. (The other 32K is hidden 'under' the Basic ROM and cartridge memory.) To obtain the high resolution printer graphics memory, I have set aside 24K of this extra memory for graphics. The 256×192 graphics screen acts as a window on this greater area of graphics memory (512×384). By pressing any of the Arrow keys with the Shift key, this window can be scrolled over the larger graphics display. Each time the window is scrolled, its contents are copied up to the 'Bigscreen', and the display for the new location are copied down. Pressing the ‹Z› key will compress this Bigscreen down to fit on the display screen so that an idea of the total picture can be gained. The program then waits for a keypress before returning to the window display.

The extra memory for the Bigscreen is accessed by a short machine code routine, BIGSCREEN (Assembler #2). It first *POKE 65283, PEEK (65283) and 254* to stop the interrupts. Then it pokes to &HFFDF to switch the computer to 64K RAM mode. In this mode, the Basic ROM and cartridge port no longer exist as far as the computer is concerned. However, the extra memory can be used, and we can copy to and from the display screen. When we are finished, the program pokes to &HFFDE to return to 32K mode, and *POKE &H65283, PEEK (65283) OR1* to restore the interrupts.

The program includes a save/load routine for both the display screen and the bigscreen. **SS** or **LS** will save/load the display screen, whilst **SB** or **LB** will save/load the Bigscreen. The display screen load/save routines ask for a screen title, and then load/save it to disc. The Bigscreen routines also ask for a title, but only use the first seven letters. The save routine will copy down the Bigscreen to the display screen in four quarters, saving each one separately, and numbering them from 1 to 4. The load routine will load each screen back to the display, and then copy it up to high memory. (If using cassette tape, remember to delete the '.BIN' from the load routines. Lines 350-380 and 860.) The last key to remember is the ‹M› which calls the menu display, to remind you of which key does what. The only routines not mentioned are the ‹Z› to display the compressed screen, and the ‹CLEAR› to PCLS the display screen.

Modifying the Program

With disk drives attached, the program only leaves about 500 bytes of memory, so there is little room for improving the program. If using cassette, the extra memory will be boosted to 2K, and there is space enough for a few extra routines, such as a fill routine.

If using discs on the 64, there is little use for the backup screen (‹C› and ‹R›) so this routine could be deleted, including the array **AR.** This would clear enough memory for several program modifications.

If using a Dragon 32, then it is advisable to delete the Bigscreen routine, and gain extra memory that way (delete 90-210). For use without a disc drive attached, the machine code routines will also have to be altered to take account of the different memory used by the graphics screens. Before saving 'BIGSCREEN', *POKE&H7E115,6: POKE&H7E225,&H1E: POKE&H7E3A,6: POKE&H7E4A,&H1E: POKE&H7E74,6: POKE&H7EDB,&H1E.*

If you do not yet have a TouchMaster Graphics Tablet, but do have a Dragon 64, it is possible to convert the program for joystick control instead of the pad. Instead of calling the PADCODE machine code routine (*EXEC32501*) one can read the joysticks, and instead of checking for a pen pressing on the pad, could check the fire-button. The program should still be able to make use of the four different drawing resolutions, and various extra routines.

Printing the Bigscreen

Because the Bigscreen is hidden under the Basic ROM, it can not be accessed by a Basic program alone. The BIGSCREEN machine code routine is required again to copy data to the display screen for printing. The printer routine (LISTING #3) is set up for the Seikosha GP100A. Lines 10-20 set up the machine code, whilst 60-100 load the graphics picture into high memory. Line 120-end prints out the picture.

The program works by copying the bigscreen down to the display screen in two lines, and then copying these to the printer. Insert a SCREEN1,0 command as Line 115, and you will be able to watch this happen. By varying the amount of data copied down (*Q* in line 180), and the printout format, the program can easily be modified to work with any other printer.

If you don't want to type in the whole program, I can supply copies on cassette tape for £3. Send a cheque or postal order to Peter Whittaker, 73 Norwich Street, Cambridge CB2 1ND.

Padcode

```
32501  :4FB7FF5DB7FF5FB7=  1326
32509  :FF5C8601B7FF5E86=  1148
32517  :04B7FF5DB7FF5FBD=  1257
32525  :7FACC1C010250096=  887
32533  :BD7FAC86403DFD7F=  1127
32541  :C2BD7FAC86013DF3=  1121
32549  :7FC244564456FD7F=  1009
32557  :C2BD7FAC86403DFD=  1194
32565  :7FC4BD7FAC86013D=  1007
32573  :F37FC444564456FD=  1127
32581  :7FC4B67FC5B77FC4=  1335
32589  :C6033D44564456F7=  817
32597  :7FC586BFB07FC5B7=  1332
32605  :7FC5B67FC3B77FC2=  1332
32613  :444444B77FC3B67F=  1018
32621  :C5444444B77FC512=  926
32629  :B67FC3F67FC58E0C=  1228
32637  :00C1002706308820=  454
32645  :5A20F6F67FC35446=  1090
32653  :544654463A444444=  570
32661  :4444C68081002704=  634
32669  :4A5420F8F77FC6A6=  1176
32677  :84BA7FC6A7843986=  1133
32685  :01B7FF5EB6FF5D84=  1195
32693  :8081001212 4FB7FF=  810
32701  :5EF6FF5C39000000=  744
32709  :00000000008000FB=  379
```

Bigscreen

```
32241  :B6FF0384FEB7FF03= 1267
32249  :B7FFDF8E80E8B67E= 1471
32257  :ED27063088404A20= 636
32265  :F8B67EEC308639BD= 1220
32273  :7DF1108E0C008620= 702
32281  :E6A0E7804A26F930= 1158
32289  :8820108C240025EE= 635
32297  :B7FFDEB6FF038A01= 1239
32305  :B7FF0339BD7DF110= 1069
32313  :8E0C008620E680E7= 909
32321  :A04A26F930882010= 753
32329  :8C240025EEB7FFDE= 1111
32337  :B6FF038A01B7FF03= 1020
32345  :395F48564856C100= 661
32353  :2707F67EEE595C20= 869
32361  :04F67EEE59F77EEE= 1314
32369  :39108E0C008E80E8= 729
32377  :B6FF0384FEB7FF03= 1267
32385  :B7FFDF8620B77EEB= 1371
32393  :A6807F7EEEBD7E5A= 1190
32401  :BD7E5ABD7E5ABD7E= 1125
32409  :5AA680BD7E5ABD7E= 1104
32417  :5ABD7E5ABD7E5AF7= 1147
32425  :7EEF7F7EEEA6883E= 1220
32433  :BD7E5ABD7E5ABD7E= 1125
32441  :5ABD7E5AA6883FBD= 1049
32449  :7E5ABD7E5ABD7E5A= 1026
32457  :BD7E5AFA7EEFE7A0= 1411
32465  :7A7EEB26B3308840= 948
32473  :108C240025A5B7FF= 832
32481  :DEB6FF038A01B7FF= 1239
32489  :0339000000000FB= 311
```

Assembler 1 — Padcode

```
7EF5            3000        PRT
7EF5 4F           20 @START   CLRA
7EF6 B7FF5D       20        STA  $FF5D
7EF9 B7FF5F       20        STA  $FF5F
7EFC B7FF5C       20        STA  $FF5C
7EFF 8601         20        LDA  #1
7F01 B7FF5E       20        STA  $FF5E
7F04 8604         20        LDA  #4
7F06 B7FF5D       20        STA  $FF5D
7F09 B7FF5F       20        STA  $FF5F
7F0C BD7FAC       30 @L0    JSR  @GETXY
7F0F C1C0         30        CMPB #192
7F11 10250096     30        LBLO @QUIT
7F15 BD7FAC       40        JSR  @GETXY
7F18 8640         40        LDA  #64
7F1A 3D           40        MUL
7F1B FD7FC2       40        STD  @X
7F1E BD7FAC       50        JSR  @GETXY
7F21 8601         50        LDA  #1
7F23 3D           50        MUL
7F24 F37FC2       50        ADDD @X
7F27 44           50        LSRA
7F28 56           50        RORB
7F29 44           50        LSRA
7F2A 56           50        RORB
7F2B FD7FC2       50        STD  @X
7F2E BD7FAC       60        JSR  @GETXY
7F31 8640         60        LDA  #64
7F33 3D           60        MUL
7F34 FD7FC4       60        STD  @Y
7F37 BD7FAC       70        JSR  @GETXY
7F3A 8601         70        LDA  #1
7F3C 3D           70        MUL
7F3D F37FC4       70        ADDD @Y
7F40 44           70        LSRA
7F41 56           70        RORB
7F42 44           70        LSRA
7F43 56           70        RORB
7F44 FD7FC4       70        STD  @Y
7F47 B67FC5       80        LDA  @Y+1
7F4A B77FC4       80        STA  @Y
7F4D C603         80        LDB  #3
7F4F 3D           80        MUL
7F50 44           80        LSRA
7F51 56           80        RORB
7F52 44           80        LSRA
7F53 56           80        RORB
7F54 F77FC5       80        STB  @Y+1
7F57 86BF         85 @S9    LDA  #191
7F59 B07FC5       85        SUBA @Y+1
7F5C B77FC5       85        STA  @Y+1
7F5F B67FC3       90        LDA  @X+1
7F62 B77FC2       90        STA  @X
7F65 44           90        LSRA
7F66 44           90        LSRA
7F67 44           90        LSRA
7F68 B77FC3       90        STA  @X+1
7F6B B67FC5       90        LDA  @Y+1
7F6E 44           90        LSRA
7F6F 44           90        LSRA
7F70 44           90        LSRA
7F71 B77FC5       90        STA  @Y+1
7F74 12           95        NOP
7F75 B67FC3      100        LDA  @X+1
7F78 F67FC5      100        LDB  @Y+1
7F7B 8E0600      110        LDX  #1536
7F7E C100        120 @S1    CMPB #0
7F80 2706        120        BEQ  @S2
7F82 308820      120        LEAX 32,X
7F85 5A          120        DECB
7F86 20F6        120        BRA  @S1
7F88 F67FC3      130 @S2    LDB  @X+1
7F8B 54          130        LSRB
7F8C 46          130        RORA
7F8D 54          130        LSRB
7F8E 46          130        RORA
7F8F 54          130        LSRB
7F90 46          130        RORA
7F91 3A          130        ABX  *DIVEIDE BY 8 TO GET BIT*
7F92 44          140        LSRA
7F93 44          140        LSRA
7F94 44          140        LSRA
7F95 44          140        LSRA
7F96 44          140        LSRA  *TO GET PIXEL*
7F97 C680        150        LDB  #128
7F99 8100        150 @S3    CMPA #0
7F9B 2704        150        BEQ  @S4
7F9D 4A          150        DECA
7F9E 54          150        LSRB
7F9F 20F8        150        BRA  @S3
7FA1 F77FC6      160 @S4    STB  @PIXEL
7FA4 A684        160        LDA  ,X
7FA6 BA7FC6      160        ORA  @PIXEL
7FA9 A784        160        STA  ,X
7FAB 39          170 @QUIT  RTS
7FAC 8601       1000 @GETXY LDA  #1
7FAE B7FF5E     1000        STA  $FF5E
7FB1 B6FF5D     1010 @L1    LDA  $FF5D
7FB4 8480       1010        ANDA #$80
7FB6 8100       1010        CMPA #0
7FB8 12         1010        NOP
7FB9 12         1010        NOP
7FBA 4F         1020        CLRA
7FBB B7FF5E     1020        STA  $FF5E
7FBE F6FF5C     1030        LDB  $FF5C
7FC1 39         1030        RTS
7FC2 0000       2000 @X     FDB  0
7FC4 0000       2000 @Y     FDB  0
7FC6 0000       2000 @PIXEL FDB  0
7FC8            3000        END  @START
```

Assembler 2 — Bigscreen

```
7DF1            1000        PRT
7DF1 B6FF03       20 @FINDMAP  LDA  65283
7DF4 84FE         20        ANDA #254
7DF6 B7FF03       20        STA  65283   DISABLE INTERRUPTS
7DF9 B7FFDF       20        STA  $FFDF   INTO 64K
7DFC 8E80E8       30        LDX  #33000
7DFF B67EED       30        LDA  @MY
7E02 2706         40 @SM1   BEQ  @SM2
7E04 308840       40        LEAX 64,X
7E07 4A           40        DECA
7E08 20F8         40        BRA  @SM1
7E0A B67EEC       50 @SM2   LDA  @MX
7E0D 3086         50        LEAX A,X
7E0F 39           60        RTS
7E10 BD7DF1      100 @COPYUP  JSR  @FINDMAP
7E13 108E0C00    100        LDY  #3072
7E17 8620        110 @CD1   LDA  #32
7E19 E6A0        110 @CD2   LDB  ,Y+
7E1B E780        110        STB  ,X+
7E1D 4A          110        DECA
7E1E 26F9        110        BNE  @CD2
7E20 308820      110        LEAX 32,X
7E23 108C2400    110        CMPY #9216
7E27 25EE        110        BLO  @CD1
7E29 B7FFDE      120        STA  $FFDE
7E2C B6FF03      120        LDA  65283
7E2F 8A01        120        ORA  #1
7E31 B7FF03      120        STA  65283
7E34 39          120        RTS
7E35 BD7DF1      200 @COPYDOWN  JSR  @FINDMAP
7E38 108E0C00    200        LDY  #3072
7E3C 8620        210 @CU1   LDA  #32
7E3E E680        210 @CU2   LDB  ,X+
7E40 E7A0        210        STB  ,Y+
7E42 4A          210        DECA
7E43 26F9        210        BNE  @CU2
7E45 308820      210        LEAX 32,X
7E48 108C2400    210        CMPY #9216
7E4C 25EE        210        BLO  @CU1
7E4E B7FFDE      220        STA  $FFDE
7E51 B6FF03      220        LDA  65283
7E54 8A01        220        ORA  #1
7E56 B7FF03      220        STA  65283
7E59 39          220        RTS
7E5A 5F          300 @SUB1  CLRB
7E5B 48          300        LSLA
7E5C 56          300        RORB
7E5D 48          300        LSLA
7E5E 56          300        RORB
7E5F C100        300        CMPB #0
7E61 2707        300        BEQ  @B0
7E63 F67EEE      300        LDB  @BYTE
7E66 59          300        ROLB
7E67 5C          300        INCB
7E68 2004        300        BRA  @B2
7E6A F67EEE      300 @B0    LDB  @BYTE
7E6D 59          300        ROLB
7E6E F77EEE      300 @B2    STB  @BYTE
7E71 39          300        RTS
7E72 108E0C00    400 @SQUASHSCREEN  LDY  #3072
7E76 8E80E8      400        LDX  #33000
7E79 B6FF03      400        LDA  65283
7E7C 84FE        400        ANDA #254
7E7E B7FF03      400        STA  65283
7E81 B7FFDF      400        STA  $FFDF
7E84 8620        400 @SQ2   LDA  #32
7E86 B77EEB      400        STA  @COLUMNS
7E89 A680        410 @SQ1   LDA  ,X+
7E8B 7F7EEE      410        CLR  @BYTE
7E8E BD7E5A      410        JSR  @SUB1
7E91 BD7E5A      410        JSR  @SUB1
7E94 BD7E5A      410        JSR  @SUB1
7E97 BD7E5A      410        JSR  @SUB1
7E9A A680        410        LDA  ,X+
7E9C BD7E5A      410        JSR  @SUB1
7E9F BD7E5A      410        JSR  @SUB1
7EA2 BD7E5A      410        JSR  @SUB1
7EA5 BD7E5A      410        JSR  @SUB1
7EA8 F77EEF      410        STB  @BYTE1
7EAB 7F7EEE      420        CLR  @BYTE
7EAB 7F7EEE      420        CLR  @BYTE
7EAE A6883E      420        LDA  62,X
7EB1 BD7E5A      420        JSR  @SUB1
7EB4 BD7E5A      420        JSR  @SUB1
7EB7 BD7E5A      420        JSR  @SUB1
7EBA BD7E5A      420        JSR  @SUB1
7EBD A6883F      420        LDA  63,X
7EC0 BD7E5A      420        JSR  @SUB1
7EC3 BD7E5A      420        JSR  @SUB1
7EC6 BD7E5A      420        JSR  @SUB1
7EC9 BD7E5A      420        JSR  @SUB1
7ECC FA7EEF      420        ORB  @BYTE1
7ECF E7A0        420        STB  ,Y+
7ED1 7A7EEB      430        DEC  @COLUMNS
7ED4 26B3        430        BNE  @SQ1
7ED6 308840      430        LEAX 64,X
7ED9 108C2400    430        CMPY #9216
7EDD 25A5        430        BLO  @SQ2
7EDF B7FFDE      430        STA  $FFDE
7EE2 B6FF03      430        LDA  65283
7EE5 8A01        430        ORA  #1
7EE7 B7FF03      430        STA  65283
7EEA 39          430        RTS
7EEB 00          600 @COLUMNS  FCC  0
7EEC 00          600 @MX    FCC  0
7EED 00          600 @MY    FCC  0
7EEE 00          600 @BYTE  FCC  0
7EEF 00          600 @BYTE1 FCC  0
7EF0            1000        END  @FINDMAP
```

Listing 1

```
10 CLEAR200,32240:PCLEAR8:PMODE4,1:SCREEN1,0:LOAD"PADCODE.BIN":LOAD"BIGSCREE.BIN"
20 CD=&H7E35:CU=&H7E10:SQ=&H7E72:X64=&H7EEC:Y64=&H7EED
30 DIM AR(1536),AB(250),L$(36):GOSUB1350
40 GOSUB820
50 P1=&H7F65:P2=P1+1:P3=P2+1:P4=&H7F6E:P5=P4+1:P6=P5+1:P7=&H7F7C:P8=&H7F74:PX=&H7FC2:PY=&H7FC4
60 GOTO570
70 A$=INKEY$:IFA$=""THEN EXEC32501:GOTO70
80 IF A$="O"THENGOSUB830:GOTO70 ELSE GOSUB820
90 IF A$<>CHR$(95) THEN 120
100 EXEC CU:A=PEEK(Y64):A=A-8:IF A<0 THEN A=0
110 POKE Y64,A:EXEC CD:GOSUB820:GOTO 70
120 IF A$<> CHR$(91) THEN 150
130 EXEC CU:A=PEEK(Y64):A=A+8:IF A>192 THEN A=192
140 POKE Y64,A:EXEC CD:GOSUB820:GOTO70
150 IF A$<>CHR$(21) THEN 180
160 EXEC CU:A=PEEK(X64):A=A-1:IF A<0 THEN A=0
170 POKE X64,A:EXEC CD:GOSUB820:GOTO70
180 IF A$<>CHR$(93) THEN 210
190 EXEC CU:A=PEEK(X64):A=A+1:IF A>32 THEN A=32
200 POKE X64,A:EXEC CD:GOSUB820:GOTO70
210 IF A$="Z" THEN EXEC &H7E72:EXEC 41194:EXEC CD:GOTO70
220 IFA$<>"S"THEN310  ELSE SOUND100,1
230 A$=INKEY$:IFA$="B"THEN 240 ELSE IF A$="S"THEN 840 ELSE 230
240 CLS:PRINT@12,"SAVE BIGSCREEN.":PRINT:PRINT:INPUT"SCREEN TITLE (**** TO QUIT)";A$:IF A$="****" THEN SCREEN1,0:GOTO70
250 A$=LEFT$(A$,7)
260 POKEX64,0:POKEY64,0:EXECCD:SAVE A$+"1",3072,9216,41194
270 POKEX64,32:EXEC CD::SAVE A$+"2",3072,9216,41194
280 POKEY64,192:EXEC CD:SAVE A$+"3",3072,9216,41194
290 POKE X64,0:EXEC CD:SAVE A$+"4",3072,9216,41194
300 SCREEN1,0:GOTO70
310 IF A$<>"L"THEN 400 ELSE SOUND100,1
320 A$=INKEY$:IFA$="B"THEN330 ELSE IF A$="S"THEN 860 ELSE 320
330 CLS:PRINT@12,"LOAD BIGSCREEN.":PRINT:PRINT:INPUT"ENTER TITLE (**** TO QUIT)";A$:IF A$="****" THEN SCREEN1,0:GOTO70
340 A$=LEFT$(A$,7)
350 LOAD A$+"1.BIN":POKEX64,0:POKEY64,0:EXEC CU
360 LOAD A$+"2.BIN":POKEX64,32:EXEC CU
370 LOAD A$+"3.BIN":POKE Y64,192:EXEC CU
380 LOAD A$+"4.BIN":POKEX 64,0:EXEC CU
390 SCREEN1,0:A$="Z":GOTO 210
400 IF A$="C"THEN SOUND100,1:GET(0,0)-(255,191),AR,G:SOUND100,1:GOTO70
410 IF A$="R"THEN SOUND100,1:PUT(0,0)-(255,191),AR,PSET:SOUND100,1:GOTO70
420 IFA$="G"THEN640
430 IFA$="P"THEN PQ=0:GOTO740 ELSE IF A$="B"THENPQ=1:GOTO740
440 IF A$=CHR$(12) THEN PCLS0:GOTO70
450 IF A$="M" THEN 870
460 IF A$=CHR$(3) THEN STOP
470 BF=0:IF A$=CHR$(8) THEN BX=BX-8:BF=1 ELSE IF A$=CHR$(9) THEN BX=BX+8:BF=1
480 IF A$=CHR$(10)THEN BY=BY+8:BF=1 ELSE IF A$=CHR$(94) THEN BY=BY-8:BF=1
490 IF BF=1 THEN GOSUB590
500 IF A$="D" THEN 920
510 IF A$="W" THEN 1020
520 IF A$="A" THEN 1230
521 IF A$<>"F" THEN 530
522 GOSUB820:LINE(BX,BY)-(BX+255-MX,BY+191-MY),PSET,B
523 FOR A=BX TO BX+255-MX STEP (256-MX)/8:LINE(A,BY)-(A,BY+191-MY),PSET:NEXT A
524 FOR A=BY TO BY+191-MY STEP (192-MY)/8:LINE(BX,A)-(BX+255-MX,A),PSET:NEXT A
525 EXEC 41194:GOSUB830:GOTO70
530 IF VAL(A$)=0THEN 70
540 ON VALL(A$)GOTO 550,560,570,580
550 POKEP1,18:POKEP2,18:POKEP3,18:POKEP4,18:POKEP5,18:POKEP6,18:MX=0:MY=0:GOSUB590:GOTO70
560 POKEP1,68:POKEP2,18:POKEP3,18:POKEP4,68:POKEP5,18:POKEP6,18:MX=128:MY=95:GOSUB590:GOTO70
570 POKEP1,68:POKEP2,68:POKEP3,18:POKEP4,68:POKEP5,68:POKEP6,18:MX=192:MY=143:GOSUB590:GOTO70
580 POKEP1,68:POKEP2,68:POKEP3,68:POKEP4,68:POKEP5,68:POKEP6,68:MX=224:MY=167:GOSUB590:GOTO70
590 IF BX>MX THEN BX=MX ELSE IF BX<0 THEN BX=0
600 IF BY>MY THEN BY=MY ELSE IF BY<0 THEN BY=0
610 A=PEEK(186)*256+PEEK(187)+BY*32+INT(BX/8):POKEP7,INT(A/256):POKEP7+1,A-256*INT(A/256):'****RESET SCREEN POINTER IN MACHINECODE****
620 PUT(BX,BY)-(BX+255-MX,BY+191-MY),AR,NOT:PUT(BX,BY)-(BX+255-MX,BY+191-MY),AR,NOT:RETURN
630 RETURN
640 POKEP8,57:GOSUB820
650 GOSUB1220:AX=X:AY=Y:GOSUB830:LINE(AX,AY)-(AX,191),PSET:LINE(AX,AY)-(255,AY),PSET
```

```
660 A$=INKEY$:IF A$=""THEN 650
670 IF A$="Q"THEN POKEP8,18:GOSUB830:GOTO70
680 IF A$<>CHR$(13)THEN 650 ELSE SOUND100,1
690 GOSUB1220:GOSUB830:LINE(AX,AY)-(X,Y),PSET,B
700 A$=INKEY$:IFA$="Q"THEN POKEP8,18:GOSUB830:GOTO70
710 IF A$<>CHR$(13)THEN 690
720 SOUND100,1:IFABS((X-AX)*(Y-AY))>10000THEN SOUND10,1:SOUND10,1:GOTO690
730 GOSUB830:GET(AX,AY)-(X,Y),AB,G:POKEP8,18:AX=ABS(X-AX):AY=ABS(Y-AY):GOTO70
740 POKEP8,57:GOSUB820
750 GOSUB830
760 GOSUB1220
770 IF PQ=0THEN PUT(X,Y)-(X+AX,Y+AY),AB,PSET ELSE PUT(X,Y)-(X+AX,Y+AY),AB,OR
780 A$=INKEY$:IFA$<>CHR$(13)THEN GOSUB830
790 IFA$="Q"THEN POKEP8,18:GOTO70
800 IFA$<>CHR$(13)THEN 760
810 POKEP8,18:GOTO70
820 FORA=1TO4:PCOPYA TO A+4:NEXT:RETURN
830 FORA=1TO4:PCOPYA+4 TO A:NEXT:RETURN
840 CLS::PRINT@5,"**** SAVE SCREEN ****":PRINT:PRINT"READY DISC FOR SCREEN DATA"
850 INPUT"ENTER NAME FOR SCREEN SAVE FILE ";A$:SAVE A$,3072,9216,0:SCREEN1,0:GOTO70
860 CLS:PRINT@5,"**** LOAD SCREEN ****":PRINT:PRINT"READY DISC TO LOAD DATA":INPUT"SCREEN TITLE";A$:LOAD A$+".BIN":SCREEN1,0:GOTO70
870 CLS:PRINT@6,"GRAPHIC PAD ARTIST.":PRINT:PRINT"1-4...SIZE OF SCREEN.":PRINT"O.....OOPS! DELETE LAST ACTION. C.....COPY SCREEN TO HIGH MEMORY";
880 PRINT"R.....RESTORE RESERVE SCREEN.":PRINT"G.....GET SCREEN ARRAY.":PRINT"P.....PUT ARRAY ON SCREEN (PSET)B.....PUT ARRAY ON SCREEN (BOTH)Q.....QUIT CURRENT ROUTINE."
890 PRINT"SS/LS.SAVE/LOAD DISPLAY SCREEN. SB/LB.SAVE/LOAD BIG 24K SCREEN. M.....DISPLAY MENU LIST.":PRINT"W.....DRAW LINE/BOX/CIRCLE":PRINT"A.....DRAW ALPHABET ON SCREEN.  F.....FRAME A GRID ON SCREEN.";
900 A$=INKEY$:IF A$=""THEN 900
910 SCREEN1,0:GOTO80
920 POKEP8,57:GOSUB820:CLS:PRINT@128,"";:INPUT"DO YOU WANT CIRCLES (Y/N)";A$:IF LEFT$(A$,1)<>"Y" THEN 960
930 INPUT"WHAT SIZE OF CIRCLE";RAD:SCREEN1,0
940 IF INKEY$="Q" THEN POKEP8,18:SOUND100,1:GOTO70
950 GOSUB1220:IF PEEK(&H7FC5)<255 THEN CIRCLE(X,Y),RADIUS,1:GOTO 940 ELSE GOTO940
960 PRINT"*** LINES/BOXES ***":INPUT"X OFFSET";A:INPUT"Y OFFSET";B
970 INPUT"LINES OR BOXES (L/B)";A$:IF LEFT$(A$,1)="L" THEN PQ=0:SCREEN1,0 ELSE PQ=1:SCREEN1,0
980 IF INKEY$="Q" THEN POKEP8,18:SOUND100,1:GOTO70
990 GOSUB1220:IF PEEK(&H7FC5)=255 THEN 980
1000 IF PQ=0 THEN LINE(X-A,Y-B)-(X+A,Y+B),PSET ELSE LINE(X-A,Y-B)-(X+A,Y+B),PSET,B
1010 GOTO980
1020 CLS:PRINT@12,"DRAW SHAPES.":PRINT:PRINT:INPUT"LINE/BOX/CIRCLE";A$:A$=LEFT$(A$,1)
1030 IF A$="L" THEN SHAPE=1
1040 IF A$="B"THEN SHAPE=2 ELSE SHAPE=3
1050 SCREEN1,0
1060 POKEP8,57:GOSUB820
1070 GOSUB1220
1080 A$=INKEY$:IF A$="Q"THEN GOSUB830:POKEP8,18:GOTO70
1090 LINE(X,0)-(X,191),PSET:LINE(0,Y)-(255,Y),PSET
1100 IF A$=CHR$(13) THEN GOSUB830:SOUND100,1:AX=X:AY=Y:GOTO1120
1110 GOSUB830:GOTO1070
1120 GOSUB1220
1130 A$=INKEY$:IFA$="Q"THEN POKEP8,18:GOSUB830:GOTO70
1140 GOSUB830
1150 ON SHAPE GOTO 1160,1170,1180
1160 LINE(AX,AY)-(X,Y),PSET:GOTO1190
1170 LINE(AX,AY)-(X,Y),PSET,B:GOTO1190
1180 CIRCLE(AX,AY),SQR((AX-X)^2+(AY-Y)^2)
1190 IF A$=CHR$(13) THEN GOSUB820:SOUND100,1:GOTO1120
1200 IF A$="Q" THEN POKEP8,18:SOUND100,1:GOSUB 830:GOTO70
1210 GOTO1120
1220 POKE&H7FC5,255:EXEC32501:IF PEEK(&H7FC5)=255 THEN RETURN ELSE X=PEEK(&H7FC3)+BX:Y=PEEK(&H7FC5)+BY:RETURN
1230 CLS:PRINT@6,"DRAW ALPHABET":PRINT:INPUT"WHAT SCALE TO DRAW (1-16)";A:IFA>16 OR A<1 THEN 1230 ELSE A=A*4
1240 DRAW"S"+STR$(A)
1245 INPUT"ENTER ANGLE OF LETTERING (0-3)  ";AN:IF AN<0 OR AN>3 THEN 1245
1250 SCREEN1,0:GOSUB820
1260 GOSUB1220:LINE(0,Y)-(255,Y),PSET:LINE(X,0)-(X,191),PSET
1270 A$=INKEY$:IF A$=""THEN GOSUB830:GOTO 1260
1280 GOSUB830:DRAW"BM"+STR$(X)+","+STR$(Y):GOTO1300
1290 A$=INKEY$:IF A$=""THEN 1290
1300 IF A$=CHR$(13) THEN POKEP8,18:
```

```
    SOUND100,1:GOTO70
1310 A=ASC(A$):IFA>47 ANDA<58 THENA
     =A-48 ELSEIFA>64ANDA<91THENA=A-
     54
1320 IFA>36THEN1290
1330 IF A$=" "THEN DRAW"A"+STR$(AN)
     +"BR10":GOTO1290
1340 A$=L$(A):DRAW"A"+STR$(AN)+"XA$
     ;":GOTO1290
1350 L$(11)="U4E2F2D2L4R4D2BR4"
1360 L$(12)="R3L2U6LR3FDGL2R2FDGBR5
     "
1370 L$(13)="BRR2EGL2HU4ER2FBD5BR4"

1380 L$(14)="R3L2U6LR3FD4GBR5"
1390 L$(15)="R4L4U3R3L3U3R4BD6BR4"
1400 L$(16)="U3R3L3U3R4BD6BR4"
1410 L$(17)="BRR2L2HU4ERFBD3LR2LD2B
     R5"
1420 L$(18)="U6D3R4U3D6BR4"
1430 L$(19)="BRRU6LR2LD6RBR5"
1440 L$(20)="BUFREU5LR2BD6BR4"
1450 L$(21)="U6D4E4G3F3BR4"
1460 L$(22)="U6D6R4BR4"
1470 L$(23)="U6F2DUE2D6BR4"
1480 L$(24)="U6DF4U5D6BR4"
1490 L$(25)="BRR2L2HU4ER2FD4GBR5"
1500 L$(26)="U3R3L3U3R3FDGBD3BR5"
1510 L$(27)="BRRLHU4ER2FD3G2EHF2BR4
     "
1520 L$(28)="U6R3FDGL3RF3BR4"
1530 L$(29)="BUFR2EUHL2HUER2FBD5BR4
     "
1540 L$(30)="BR2U6L2R4BD6BR4"
1550 L$(31)="BRR2L2HU5BR4D5GBR5"
1560 L$(32)="BR2UHUHU2BR4D2GDGDBR6"

1570 L$(33)="E2UDG2U6BR2BD4F2U6D6BR
     4"
1580 L$(34)="UE2H2UBR4DG2F2DBR4"
1590 L$(35)="BR2U3H2UBR4DG2D3BR6"
1600 L$(36)="R4L4UE4UL4R4BD6BR4"
1610 L$(0)="BUU4ER2FG4FR2EU4BD5BR4"

1620 L$(1)="BRRU5LRUD6RBR5"
1630 L$(2)="R4L4UE2REUHL2GBR8BD5"
1640 L$(3)="BUFR2EUHLE2UL4BR8BD6
1650 L$(4)="BU3R4L4E3D6BR5"
1660 L$(5)="R3EU2HL3U2R4BR4BD6"
1670 L$(6)="BUU2R3FHL3UE2R2BD4DGL2H
     FBR7"
1680 L$(7)="UE4UL4BR8BD6"
1690 L$(8)="BUUER2L2HUER2FDGFDGL2HF
     BR7"
1700 L$(9)="BU4UER2FD2L3HFR3DG2L2BR
     8"
1710 RETURN
1720 '(C) 1986 BY PETER WHITTAKER
```

Listing 2 Hex-Loader

```
10 'HEX LOADER FOR 'WORDPROC' MEMOR
   Y DUMP. BY PETER WHITTAKER
20 INPUT"START ADDRESS";START
30 INPUT"FINISH ADDRESS";FINISH
40 FOR N=START TO FINISH STEP 8
50 PRINT N;": ";
60 TT=0:INPUT A$:Z=0
70 FOR M=1 TO LEN(A$) STEP2
80 L=VAL("&H"+MID$(A$,M,2))
90 TT=TT+L:POKEN+Z,L
100 Z=Z+1:NEXT M
110 PRINT" = ";
120 INPUT T
130 IF T<>TT THEN PRINT"error - ENT
    ER LINE AGAIN":GOTO50
140 NEXT N
```

Listing 3 Bigscreen — dump

```
10 CLEAR200,32240:PCLEAR8:PMODE4,1:
   LOAD"BIGSCREE.BIN"
20 CD=&H7E35:CU=&H7E10:SQ=&H7E72:X6
   4=&H7EEC:Y64=&H7EED
30 SCREEN1,0
40 PRINT#-2,CHR$(8);CHR$(13);
50 '***** GET PICTURE *****
60 CLS:PRINT@128,"LOAD BIGSCREEN TO
    HIGH MEMORY.":PRINT:INPUT"ENTE
   R SCREEN TITLE";A$:A$=LEFT$(A$,
   7)
70 LOADA$+"1.BIN":POKEX64,0:POKEY64
   ,0:EXECCU
80 LOADA$+"2.BIN":POKEX64,32:EXECCU
90 LOAD A$+"3.BIN":POKEY64,192:EXEC
   CU
100 LOADA$+"4.BIN":POKEX64,0:EXECCU
110 '***PRINT OUT LOOP ****
120 POKE65283,PEEK(65283)AND254 :'D
    ISABLE INTERRUPTS
130 Q=255:GOSUB180
140 POKE&H7DFD,&HC1:POKE&H7DFE,&HA8
    :Q=119:GOSUB180
150 PRINT#-2,CHR$(13);CHR$(15)
160 POKE65283,PEEK(65283)OR1
170 STOP
180 FOR Y=0 TO Q STEP 7
190 POKEX64,32:POKE Y64,Y:EXECCD:PC
    OPY 1 TO 5:POKEX64,0:EXECCD:PCO
    PY5 TO 2:''PULL DOWN TOP LINE O
    F GRRAPHICS.
200 FORX=0 TO 255:Z=PPOINT(X,0)+PPO
    INT(X,1)*2+PPOINT(X,2)*4+PPOINT
    (X,3)*8+PPOINT(X,4)*16+PPOINT(X
    ,5)*32+PPOINT(X,6)*64+128:PRINT
    #-2,CHR$(Z);:NEXT X
210 FOR X=0 TO 223:Z=PPOINT(X,48)+P
    POINT(X,49)*2+PPOINT(X,50)*4+PP
    OINT(X,51)*8+PPOINT(X,52)*16+PP
    OINT(X,53)*32+PPOINT(X,54)*64+1
    28:PRINT#-2,CHR$(Z);:NEXT X
220 NEXT Y
230 RETURN
240 '(C) 1986 BY PETER WHITTAKER.
```

Expert's Arcade Arena

Write to 'The Expert' at Dragon User 12-13 Little Newport St, London WC2H 7PP, with all your arcade tips and hints.

GOOD DAY to all you good people and welcome to this, the third column. Yes, already this is a part of history. There have been so many letters that my entire house is packed with them. My postman has a hernia. My lover has left because she can't get into the bedroom for letters. On a scale of large to small this postbag would not be anywhere near small.

But, loyal to you as I am, I have read every one of them and tested some of the pokes, and tried out the maps, and basically worked my rocks off so that you, my loving, adoring, readership have this column here for you.

So, to business, first of all some news: some of you may be aware that Blaby have released a game similar to Atic-Atak. Well, you will soon have a choice between that, and a version of the same by Microdeal. Having seen both I can simply say that the Microdeal one is closer to the original but the Blaby one is more of an adventure (ie certain objects are needed to pass certain locations). I won't recommend one above the other, no doubt the reviewers will do that for me, but I can say that I have no preference between them at the moment from the limited time I've played them.

Moving rapidly to your letters, first a big thank you for all the Jet-Set Willy maps. I have decided that the one published was the best of them as it contained a lot of relevant information in a clear table as well as a simple map.

Thank you to C. A. Smith, M. R. Vine, D. R. Gardener, Mark Bowen, Gavin Long, and Michael Ellison for their maps and also to anyone else who has sent one which I may have not received by copy deadline.

Now then, to some specific points. Mark Bowen of Kent writes with the following pokes:

Ninja Warrior — Load up the game, type POKE 9489, N (where N is the number of lives) then type EXEC.

Mark says he has still got no further than level 4 and that we have not reviewed it. Well, Mr Mark Know-all Bowen if you take a look through your back issues to the issue dated October 1983 you will find John Scriven's review which, for those not born then, I shall re-present (in glorious non-technicolour) here:

"My award for the most original game of the month has to go to Ninja Warrior from Programmer's Guild. In this excellent game, you, and up to five other players, control some figure wearing a judo suit. The ground scrolls beneath his feet, and you can use a joystick to slow him down, speed him up, or make him jump in the air. The "fire" button controls a sharp karate kick that he performs.

"To gain a white belt, the landscape is littered with boulders that he can jump over, but a higher score is achieved by kicking them to dust. If he survives with toenails intact the test for higher grade belts present him with fires to jump over, pits to traverse, and even arrows to catch. Eventually (so they tell me!), your warrior becomes a black belt. For me this was a highly entertaining game using a novel idea, smooth graphics, and good sound. I hope future programs from Programmer's Guild will be as good."

I believe Computape are now the sole suppliers of Ninja Warrior but I'm sure that you will correct me if I'm wrong. Personally, I'm quite a fan of the game although my friends all find it rather boring! I have nudged the *Dragon User* office into giving it a re-review so expect one soon. My ratings stand at the end of this month's column.

Mark goes on thus:

"Do you know if Design Design are planning any new games?" — No, I don't, but I'll find out for you — "Is anyone any good at Dark Star?" — Yes, I am — "and if so how?" — I suppose I'm just brilliant.

". . . It is about time you started this arcade arena. It is always claimed that your magazine must mediate between games and serious applications but there are always twice as many advertisements for games than serious applications so why not twice as much Editorial? The point I am making is that your column should cover two or three pages . . ."

I agree with Mark but I'd like to know how you feel about it. Write to the usual address clearly marking your letters "The Expert".

Mark concludes by suggesting that my style is very similar to that of Jason Orbaum (one of the reviewers). An interesting concept Mark, complete rubbish, but interesting nonetheless, and it has led me to spark off a "Who is The Expert?" competition. Yes, send your guesses as to who I might be to the top address and the most interesting and amusing suggestion each month will win a prize worth absolutely NOTHING! I'll give you a clue to push you in the right direction:

I AM NOT NECESSARILY HUMAN.

Right, that's the competition set up, now here's a cry for help from Matthew Fasham of Hindhead, he would like to know how to do the last screen in Fantasy Fight . . . Write if you have a foolproof method.

I'd like some more maps from you all please, games I'm interested in this time are "Fantasy Fight", "The Dark Pit" and "The Wizard's Lair". Send them to the same address as usual please.

D Flintham of Burnsley suggests I publish his hi scores saying he hopes I use a full or half page to publish them because it gives people something to beat. Well, I'm quite adamant to refuse for the following reasons:

(1) I have no way to verify the scores or prove that they were not obtained on hacked versions of games.

(2) I don't really believe that people are interested in reading other people's hi scores, publishing them just serves to massage some probably already overlarge egos.

(3) There is, in my mind, no such thing as healthy competition. The idea of the column is not to find superiors but to co-ordinate with each other to create a healthy environment in which we all share. My function is that of a co-ordinator, albeit a highly talented one! Think of this as a computer kibbutz!

That's about it for this month. Please keep writing, I have bought myself a warehouse to store your letters in so I'm all set now! See you next month with lot of pokes and some interesting ideas on Stereotyping you might like to mull over . . . and I promise we'll be back to the stupid humour again as well. I don't know how you can wait!

	G	P	A	V
Ninja Warrior (Programmer's Guild)	6	8	10	9
Ruby Robba (Blaby)	7	8	8	8
Pub Crawl (B & H)	5	7	6	6
Grabber (Microdeal)	6	9	7	8
Superbowl (Cable)	4	4	0	3

The Mansion of Jet Set Willy

1. THE BATHROOM
2. THE OBSERVATORY
3. NOMEN LUNI
4. UPON THE ROOF
5. UPON THE BATTLEMENTS
6. THE WATCH TOWER
7. WE MUST PERFORM A QUIRKAFLEEG
8. I'M SURE I'VE SEEN THIS BEFORE
9. RESCUE ESMERELDA
10. TOP OF THE HOUSE
11. CONSERVATORY ROOF
12. UNDER THE ROOF
13. THE ATTIC
14. DR.JONES WILL NEVER BELIEVE THIS
15. THE GAMES ROOM
16. EMERGENCY GENERATOR
17. PRIEST'S HOLE
18. ABOVE WEST BEDROOM
19. ABOVE WEST WING

The MANSION of ---- Jet Set Willy

by C.A. Smith

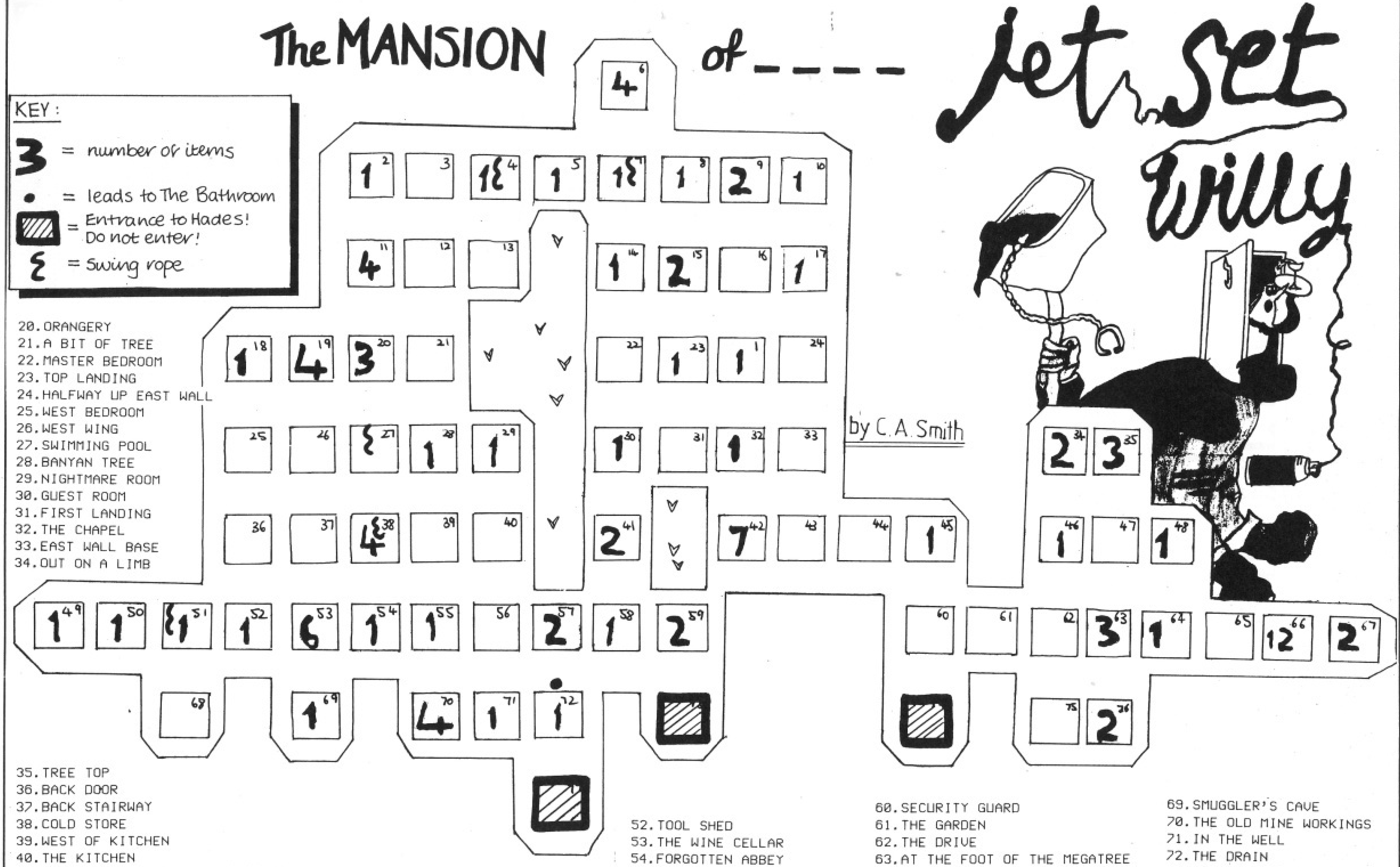
KEY:

3 = number of items

• = leads to The Bathroom

▨ = Entrance to Hades! Do not enter!

ξ = Swing rope



20. ORANGERY
21. A BIT OF TREE
22. MASTER BEDROOM
23. TOP LANDING
24. HALFWAY UP EAST WALL
25. WEST BEDROOM
26. WEST WING
27. SWIMMING POOL
28. BANYAN TREE
29. NIGHTMARE ROOM
30. GUEST ROOM
31. FIRST LANDING
32. THE CHAPEL
33. EAST WALL BASE
34. OUT ON A LIMB
35. TREE TOP
36. BACK DOOR
37. BACK STAIRWAY
38. COLD STORE
39. WEST OF KITCHEN
40. THE KITCHEN
41. TO THE KITCHENS/MAIN STAIRWAY
42. BALLROOM WEST
43. BALLROOM EAST
44. THE HALL
45. FRONT DOOR
46. ON A BRANCH OVER THE DRIVE
47. INSIDE MEGATRUNK
48. CUCKOO'S NEST
49. THE BOW
50. THE YACHT
52. TOOL SHED
53. THE WINE CELLAR
54. FORGOTTEN ABBEY
55. MATTHEW'S NEXT GAME
56. AT THE TOP OF THE WELL
57. HALL OF MIRRORS
58. JIM'S NASIUM
59. THE TRIBBLE HUTCH
60. SECURITY GUARD
61. THE GARDEN
62. THE DRIVE
63. AT THE FOOT OF THE MEGATREE
64. UNDER THE MEGATREE
65. THE BRIDGE
66. THE OFF LISCENCE
67. THE PUB
68. SECRET PASSAGE
69. SMUGGLER'S CAVE
70. THE OLD MINE WORKINGS
71. IN THE WELL
72. THE DRAIN
73. ENTRANCE TO HADES!!!
74. ENTRANCE TO HADES!!!
75. UNDER THE DRIVE
76. TREE ROOT
77. ENTRANCE TO HADES!!!



LET'S BEGIN with details of another freebie — there, that should get everyone's attention. With the help of a solution from Simon Hargrave of Crawley Hill Farm, Uley, Dursley, Glos. GL11 5BH, I've prepared a handout on *Trekboer*, so if you want a copy of that send in the usual s.a.e. and your wish will be my command.

One reader wrote in asking what were the various handouts available, so time for an up-date on those, methinks. Firstly I've got a clue sheet for *Madness and the Minotaur*, as originally supplied by Dragon Data to anyone who wrote in with queries on that game. I've also got a copy of the notes that were on the cassette inlay card for *El Diablero*, as copies of this adventure now tend to be sold without the inlay, and the notes on it really do help you get started on what is a difficult game. Finally I've got solutions to *The Cricklewood Incident, Fishy Business* and *Franklin's Tomb*. If you want copies of those then you only need send in a *small* s.a.e. — some readers send me envelopes you could fit an elephant in. For your information, I have the handouts on file on disc and simply print one out on A4 paper whenever I get a request for one.

A reader from Swansea, whose name I won't give in case he gets inundated with similar requests, decided to provide his own freebies. This reader used to be a tester for Salamander, and had spare copies of *White Cliffs of Dover* and *Franklin in Wonderland*, which he sent to S. Goodman who'd been asking about the games in an earlier column. Thank you for that, and for the information that before loading either game you must POKE 25,6: NEW to create the extra memory both programs require. (And thanks to Mrs Fitzgerald of Abergele who phoned the office with the same information.)

Madness

S. J. Edwards from 6 Barnfield, New Malden, Surrey KT3 5RH says, "Congratulations on producing the best adventure column in *any* magazine." Well, shucks, one does one's best, and I'd like to take this opportunity to thank my editor (whoever it is), my co-stars, my producer, my . . . (rest of speech deleted.) Anyway, what S. J. Edwards says is that he's having difficulty tracking down copies of the following and would be interested to hear from anyone keen to sell or swap *Madness and the Minotaur, Dragon Mountain, Calixto Island, Black Sanctum, Adventures Trilogy, Viking, Monsters and Magic* and several titles that Touchmaster are now apparently sold out of: *Final Countdown, Mansion of Doom, Stalag/Eno, Poseidon Adventure* and *Cimmeon Moon*. He also wants, though they're not adventure, *Dragon Forth, Logo,* and *Dragon DOS*.

Help on a few titles is offered by Douglas Field, 14 Lawnswood, Hessle, N. Humberside HU13 0PT, the titles being *Keys of the Wizard, Fun House* and *Pirate Adventure*. In return he asks if anyone knows where he can buy some cut-price adventures for his 32k Tandy Coco. Any offers?

Help

Peter Williamson of 37 Battenhall Road, Worcester WR5 2BQ is also trying to do me out of a job and offering help to anyone stuck on *Juxtaposition*, while Mark Gadsby has completed *Black Sanctum, Calixto Island, Eno, Death Mines of Sirus* and *Shenanigans*, and offers help on any of those. Don't forget the s.a.e. when writing to any reader for help, of course. Mark wants to know if anyone has come across any adventures in French or German, so he can combine his favourite hobby with his 'O' level revision. A nice trick, Mark, and if anyone can help him get away with it write to Mark Gadsby, 157 Pinewood Park, Cove, Farnborough, Hants GU14 9LE.

If you were studying Italian, Mark, you could have tried contacting Marco Foedda of Via San Rocco 9, cap 37125 Verona, Italy. Marco wrote to say that after three months of difficulties he eventually finished "the fantastic *El Diablero*." I think the post had difficulties, too, as Marco wrote in January and the letter arrived in April. Still, he offers help to anyone stuck in the adventure, or if you just fancy contacting an Italian Dragon owner, why not write?

Christopher Bayne from St Albans wrote about various things, including the suggestion that to make more space for the actual column we should remove the large heading and also refrain from printing cassette covers and other illustrations on the page. Personally I think a solid page of text would look pretty boring, but has anyone else any strong views on that? Christopher also suggests that a few notes for beginners should be made available, so leaving even more room in the actual column for product reviews and clues. If there's sufficient demand from beginners for that, then I'll try to do something about it.

To keep Christopher happy, then, I'd better get on with some clues, like these from Stuart Estell of Birmingham. In *Ice Kingdom*, to kill Harkon: YRUOMRA MORF DLEIHS AND DROWS ESU. To escape the dungeon: NAMWONS RAEN ECI MORF NIOC ESU. In *Towers of Death*, to kill Medusa: RORRIM TNIOP. The order in which to move the armour: EERTH OWT OWT ENO.

A few clues on *Trekboer* from Matthew Norman of Edmonton. To cross the force field: HPATONEC MORF TELUMA YRRAC. To remove grate: TI REVO DICA RUOP. More help from a reader in Denby Dale who forgot to sign his or her name. On *Franklin's Tomb*, to stop the water in the aquarium: 'ELOH-GULP' EPYT DNA GULP DNIF. To find the key: 'HSSMURG' YAS DNA HSSMURG EUTATS OT OG. To open sarcophagus: SRALLEC EHT MORF DIUQUL A RO HTUOM STI OTNI RETAW RUOP.

Can anyone tell Pat Perry where to dip the twig in *El Diablero*? Come to that, can anyone tell me?? Pat lives at 30 Leas Road, Mansfield Woodhouse, Notts, and I live in an old shoebox in the corner of the *Dragon User* office.

Code

Andrew Hill has got a code, not in the node but in *Operation Safras*, and he's willing to pass the information on to others, particularly Justin Field who was asking about it in the April issue. The code for part 1 is 13 (ENTER), and for part 2 is TANGO. There didn't seem much point in printing those brief things backwards, so I hope nobody minds. Andrew also asked for a good adventure for a beginner, preferably with graphics — the adventure, that is, not the player. I'd have thought something like *Black Sanctum* or *Sea Quest* would fit the bill, both with graphics, both enjoyable, not too difficult for the experienced player but good for the beginner in that all the problems are fairly logically solved and the scale of the games isn't so big that you get lost wandering down endless corridors and through mazes.

Gavin Griffin has already had a mention in the column, but somehow his address came out wrongly so I'll try again: 58 Old

Bawn, Park Tallaght, Co. Dublin, Ireland. That's what it looks like, anyway, but as Gavin's handwriting is a mix of upper and lower case it's a bit tricky to read. Letters will reach him anyway, I'm sure, and the reason for writing is that Gavin does like hearing from other readers, and can help with *Shenanigans* (not surprisingly), *Juxtaposition, Calixto Island, Black Sanctum, Keys of the Wizard, Madness and the Minotaur* and most of *Trekboer*. Gavin kindly sent me a map of the lands of *Juxtaposition*, which he asked us to print, but the quality of the photocopy isn't good enough to reproduce, I'm afraid. Gavin says we should have a pen-pals section in the Magazine — well, if enough readers want it then we'll introduce it, but as I'm always printing readers' addresses anyway, I hope you always feel free to write to each other without needing a formal introduction. So if you want an Irish pen-pal with an interest in swapping tips, pokes and adventure hints, then Gavin's your man.

Stephen Hootan (I think) of 4 Bankscroft, Langton, Preston, Lancs PR4 5AL also sent in a *Juxtaposition* map, and we will see about reproducing that as several readers have asked about one, and Stephen thinks the adventure section should be a lot longer — by at least five pages! Steady on, Stephen. Too much late-night adventuring has affected your brain, I think. What Stephen needs help on is *Mansion of Doom* and *Poseidon Adventure*. In the former, how to get across the acid to reach the coffin, and in the latter how to get across the oil lake in level three. He also asks if anyone has hints sheets and maps of these titles. Not me, so over to you.

Nick Hodge has completed *Juxtaposition*, which he thinks every dragon owner should buy, so if you have and get stuck write to Nick at Caramic, Huntworth, Bridgewater, Somerset TA7 0AJ. Nick sent me no less than 20 clues for the game — maybe I do need an extra five pages after all.

Some people have been having co-ordination trouble in *Syzygy*, so James Bonfield of 7 Water End, Wrestlingworth, Sandy, Beds SG19 2HA to the rescue: "To enter the co-ordinates you must take the row you wish and then press the numbers and pull the lever. For example, if you wanted to go to the planet you must type PRESS ZERO, PRESS FOUR, PRESS ONE, PRESS FIVE, PULL LEVER. The first place to go to is the planet." James also gives the other co-ordinates you need, which are 2.7-3.0 to the emerald and 1.6-0.3 to Darth Vader. James is having trouble with *Keys of the Wizard*, and adventure not many have managed to solve, and wonders: how to open the wizard's gold box; how to open the chest in the hidden temple; how to open the store box in the hidden tomb; and how to defeat the jester. If anyone has managed to put together a solution on *Keys of the Wizard*, do send it in then I can start another column by saying "Let's begin with details of another freebie."

Adventure Contact

To help puzzled adventurers further, we are instituting an Adventure Helpline — simply fill in the coupon below, stating the name of the adventure, your problem and your name and address, and send it to Dragon User Adventure Helpline, 12/13 Little Newport Street, London WC2H 7PP. As soon as enough entries have arrived, we will start printing them in the magazine.

Don't worry — you'll still have Adventure Trail to write to as well!

Adventure ....

Problem ....

....

Name ....

Address ....

....

Adventure Contact

Adventure Castle Adventure **Problem** Is it possible to smash glass in north exit, if so how? How do I unstiffen the windlass? **Name** Andrew Hall **Address** 59 Wordsworth Avenue, Castle Ridge, Stafford ST17 9UE.

Adventure Seaquest **Problem** What do you do with the mermaid? Where do you tie the balloon to? What use is the metal detector? Where is the key? **Name** Robert Gooding **Address** 52 Tollerton Drive, Irvine, Ayrshire KA12 0QE.

Adventure Aquanaut 471 **Problem** I can't seem to do anything — keep going about first few locations, but can't find anything or go anywhere different. **Name** Robert Gooding **Address** 52 Tollerton Drive Irvine, Ayrshire KA12 0QE.

Adventure Juxtaposition **Problem** How do I get over the first balcony? Is there a hint sheet? **Name** Andrew McCallum **Address** 23 Top Cliff Court, Morley, Nr. Leeds CS27 8UG.

Adventure Trekboer **Problem** How do I get past the forcefield? **Name** Neil Davies **Address** 15 Packe Close, Feering, Colchester, Essex CO5 9LP.

Adventure Juxtaposition **Problem** How do you get the emerald? Where are the Deeds of Brown? **Name** Wayland Mitchell **Address** Ashleigh Farm, Gayton-le-March, Nr. Alford, Lincs LN13 0NW.

Adventure Demonkite **Problem** Have found dead king, long tough rope and burning torch and the full stop. (That's what it says). **Name** Conrad Evans **Address** 92 Maesglas, Cardigan, Dyfed, Wales SA43 1BE.

Adventure Treckboer **Problem** Can't get past the force field or get to the Great. **Name** Seth Robinson **Address** 8 Broomhouse Close, Denby Dale, West Yorks.

Adventure Black Sanctum **Problem** How do you get out of the forest? And everything after that? **Name** Neil Pyatt **Address** 51 Marlborough Close, Grays, Essex RM16 2SU.

Adventure Juxtaposition **Problem** Where's the red cetite ore? Where's the spade? Please help. **Name** Simon Jones **Address** 37 Collins Meadow, Harlow, Essex CM19 4EN.

Adventure 1) Operation Safras 2) Adventure Trio **Problem** 1) Can't get past the first chapter. I can answer the questions, but not get the code. 2) Completely stuck. **Name** Anndrew Marriott **Address** 17 Goodwood Place, Trentham, Stoke-on-Trent ST4 8BO.

Adventure Wings of War **Problem** How do you get past guard with Luger in chateau? **Name** Mark Lane **Address** 11 Hampden Close, Bicester, Oxon OX6 7UG.

Adventure Juxtaposition **Problem** I can't get out of the emerald tower with the Eridani Emerald. **Name** Simon Pate **Address** 4 Alder Close, Bradley, Wrexham, Clwyd LL14 4BJ.

Adventure Operation Safras **Problem** Can only find agent number one, need help to find the others. **Name** Margaret Wardlow **Address** 21 Acacia Avenue, Chapeltown, Sheffield S30 4PQ.

Adventure Barons of Ceti V/Juxtaposition **Problem** Where are the deeds of Brown? **Name** Steven Edington **Address** 60 Thorburn Road, Newferry, Wirral, Merseyside L62 1EW.

Adventure Juxtaposition **Problem** I am on street level, but I can't find the mono car. **Name** S. Monoghan **Address** 41 St Brendan's Cresent, Greenhills, Walkinstown, Dublin 12, Ireland.

Adventure Juxtaposition **Problem** I can't get past the JKL Droid. How do you get on to the planet surface? Is there a hint sheet? **Name** Howard Johnston **Address** 10 Greenhill, Alveston, Bristol BS12 2QY.

Adventure Total Eclipse **Problem** How much do you need to go to a higher tech level? **Name** D. Clubb **Address** 254 Baldwin's Lane, Croxley Green, Rickmansworth, Herts WD3 3LQ.

Adventure Return of the Ring **Problem** What do you do on the forest moon? **Name** Matthew Lovell **Address** 15 Darren Close, Cowbridge, South Glamorgan, Wales.

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Mind The Cracks

***Gordon Lee** hops from slab to slab in pursuit of this month's prizes — some great incentives.*

LAST MONTH we took a cursory look at random numbers, including reference to the 'Dragon's' random number generating function. This, as is the case with the same command on other microcomputers, has the disadvantage of producing the same sequence of numbers when starting from cold. Clearly, if we are using this command in a program this problem needs to be overcome. An adventure type game would be of limited interest if, for example, objects were always set at the same locations and the response to specific commands were always the same. Similarly, with arcade games, moving objects that are too predicatable would not provide much of a challenge!

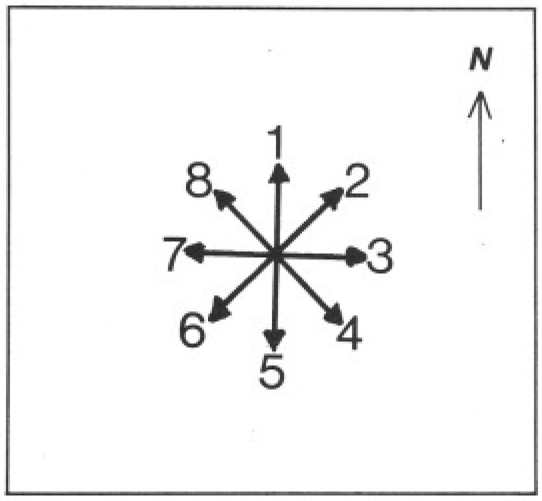
One way of overcoming this problem is to include the following lines in your program:

```
100 PRINT "PRESS A KEY TO
    CONTINUE"
110 A$=INKEY$:X=RND(10): IF
    A$= "" THEN 110
```

The lines are numbered here 100 and 110, but they can be altered to fit anywhere in your program, preferably near the beginning, say following the title or instruction page. Using this routine, the computer will spin through its sequence of random numbers for an unpredictable period of time (until a key is pressed), and will so ensure that subsequent use of the random command will produce a truly unpredictable number.

Last month, I gave a listing for a program which used the RND function to plot a random walk on the Dragon's 32 by 16 low resolution text screen. This concept of 'random walking' has received a certain amount of attention in the mathematical press. At its simplest, such a walk can be one-dimensional. Imagine that you are standing on a straight line, stretching in both directions to infinity. You toss a coin. If it falls heads, you move one step to the left; if it falls tails, you move one step to the right. By expanding this concept to two dimensions we arrive at a walk on a plane surface, like the one illustrated in last month's program. The competition this month involves taking a random walk on a much larger plane surface. Imagine a square quadrangle paved with a regular arrangement of square paving slabs, 101 slabs along each edge. The quadrangle consists of a central area of 99 by 99 white slabs, and around this is a single row of grey slabs.

Starting at the very centre square we are going to take a random walk, using a pseudo-random sequence of digits to decide on the direction of travel. This is determined by taking successive digits in the decimal part of the expression 1/17389 which begins 0.000057507619 . . .



Each digit determines the direction in which we move, as shown in the diagram. So, for '1' move one square north, for '2' move one square diagonally north-east, and so on. The digits zero and nine are ignored whenever they occur. So we would start our journey by moving south, west, south, west, etc. The question is, at which point would we be forced to first step onto one of the grey border slabs? Please give your answer in the form: 'North edge, 17th slab from north-west corner' — or whatever!

For collectors of mathematical trivia, the decimal value of 1/17389 repeats in cycles of 17388 digits. Its full value was first calculated by the 19th century mathematician William Shanks, who also computed the value of *pi* to 707 decimal places. When this value of *pi* was examined it was found that the digit '7' occurred much less frequently than did the other digits. Scholars of the time put forward all sorts of theories as to why this should be. In fact, Shanks had made an error in his original calculation, and all digits after the 528th were incorrect. Once this had been remedied the frequency with which the ten digits occurred, balanced out, as indeed they do for even longer expansions of the value of *pi*. In this respect, *pi* itself would be a pseudo-random generator.

We began, last month, by linking *pi* and random numbers so it is perhaps appropriate that we should now conclude at this point.

Prize

This month we're back in arcade country, with 20 copies of last month's five-star reviewee shooty space ships game *Moon Cresta,* courtesy of Incentive Software, as prizes. So take steps to locate the answer, and win some well-earned brain relief.

Rules

To win a prize game, you must send us the answer to the problem in the form of the location of the slab in question, and a printout (or typeout) of the program you used to solve it. No cassettes please — they won't fit in the competition box.

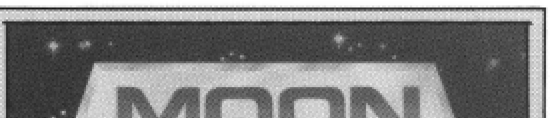
Make sure your name and address are printed clearly on your entry, and mark the outside of your envelope 'July Competition' (without which your entry will not even find the competition box).

As a tie-breaker, complete the following phrase: "The Dragon takes a giant step . . .".

Entries must reach us by the end of August, and winners will be announced in the September edition. Tie-breakers will be judged on their memorability and the editor's decision is, as usual, final.

April Winners

The 15 lucky winners will be receiving copies of *Beanstalker* from Micro Vision. They are: E. A. Newman of Addlestone, M. J. Stentiford of Kingkerswell, M. Ingram of Leeds (phew! one short name), J. C. Gilcrest of Carshalton, M. Stone of Jerusalem, Mark Heaps of Washingborough, Phil Sapiro of Woolton, Liverpool, Olav Nielsen of Rulkedalen, Denmark, C. Jolly of Grove Park, London, D. Dickenson of



Rowley Park, Stafford, F. J. Taylor of Acklam, Middlesbrough, Justin Hewitt of Hixton, Staffs, Lionel Depeux of Asnières, France, A. A. Sissiqui of Chiswick, and Rachel Edmunds of Sedgefield, Co Durham.

All agreed that the number of volunteers in the room was 52 (not counting the Competition Master, who could make a 53rd — but we didn't need to know that). Tie-breakers were heavy on the beans but our favourite read: "I want to visit Giantland . . . because I think I left my car keys there."

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